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STEEL

The Magazine of Metalworking and Metalproducing

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JULY 25, 1949

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Editorial Index available semiannually; STEEL also is indexed regularly by Engineering Index Inc., 29 West 39th St., New York 18

★ Denotes Regular Features.

NEXT WEEK...

Cold Shaping Steel—Part II

Tooth Finishing with Modified
Gear Shaper Cutters

Production of Tin Plate—Part I

Pacific Coast Plant Extends
Barmaking Facilities

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This new volume of more than three hundred 8¼" by 11" pages describes in detail, modern forming techniques as applied to austenitic chromium-nickel stainless steels. Tables of engineering data and more than two hundred engineering drawings are used to supplement the text.

Contents

★

MECHANICAL PROPERTIES OF CHROMIUM-NICKEL STAINLESS STEELS

FORMING CHARACTERISTICS OF AUSTENITIC STAINLESS STEELS

PROCESSING AFTER FORMING

DESIGN, LAYOUT AND PREPARATION OF BLANKS

EQUIPMENT, TOOLS AND LUBRICANTS

BENDING AND STRAIGHT FLANGING

THE FORMING OF CURVED SECTIONS AND TUBING

FORMING OF CONTOURED-FLANGED PARTS

DEEP DRAWING OF CUP-SHAPED, BOX-SHAPED AND RELATED PARTS

DOUBLE-ACTION DIE FORMING OF DEEP- AND SHALLOW-RECESSED PARTS

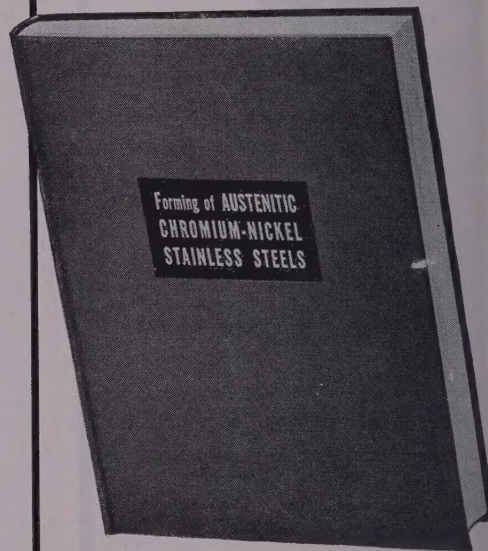
FORMING OF DEEP- AND SHALLOW-RECESSED PARTS BY MISCELLANEOUS METHODS

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STEEL

July 25, 1949

Their Handicap

Next Thursday the fact-finding board appointed by President Truman to make recommendations in the steel labor dispute will conduct open hearings in New York. Considering the circumstances under which they were asked to serve, the three members of the board—Messrs. Daugherty, Rosenman and Cole—find themselves in a difficult position.

It can be assumed that these men, with excellent records of private and public service behind them, will try hard to determine the true facts involved in the current dispute and to make recommendations on an impartial basis. Notwithstanding their high resolve to do this, they cannot dismiss from their minds the fact that neither President Truman nor Philip Murray has made any effort to disguise his feelings that politics has been injected into the steel dispute and into the government's intervention in it. Mr. Murray and his associates feel that Mr. Truman and his administration owe a debt to the union. Mr. Truman, in turn, publicly acknowledges this debt. It goes without saying that Messrs. Truman and Murray hope that the board's recommendations will help discharge the debt.

It is impossible for anybody to know to what extent, if any, knowledge of this political alliance will affect the work of the three fact-finders. From the standpoint of the development of better collective bargaining procedure, it is unfortunate that they were asked to serve under such a handicap.

Beyond the limits of this current situation is the problem of handling labor disputes in the future. Is the nation unconsciously drifting into a situation wherein the government through political alliances inevitably will work in collusion with one side in a labor dispute against the other side? If not, under what circumstances will it be possible to reverse the present trend and to establish a situation where the government sits in an impartial position, able to insist upon fair play for both sides?

These questions are of the utmost importance, because if labor disputes are to be handled on a political basis permanently, the nation is in for serious trouble. Regardless of how the present situation turns out, now is the time to work for a system under which labor disputes can be settled on merit and justice.

* * *

EASING UNEMPLOYMENT: It will be interesting to watch the administration's current efforts to ease unemployment. The first step is for the Department of Commerce to make a study of economic conditions in the areas in which unemployment is most serious. The findings are to be turned over to a 20-man committee, headed by John R. Steelman, presidential assistant, which will utilize the data in determining the surplus labor areas in which government spending and construction activities should be concentrated to relieve distress.

According to present plans, no additional public works spending is contemplated nor is it intended to divert defense contracts from areas of high employment to those of high unemployment. However, if speeding up projected government work would provide relief, that may be done. Also if placing pending new defense contracts in a stricken area would help, that may be done.

These correctives are rather mild, but there is little assurance that once the government gets started it will stop with these measures. If the

(OVER)

AS THE EDITOR VIEWS THE NEWS

announced mild program proves ineffective and if private jobs are not forthcoming in sufficient volume to reduce unemployment to reasonable levels, then experimenters in government will be ready with schemes of more drastic nature.

It should be remembered that previous attempts to cure unemployment by government spending have failed. This time it might be well to consider ways by which the government can help industry to increase private employment.

—p. 29

* * *

TEST ROLLER BEARINGS: Investigators at the Thomson laboratory of General Electric Co. have been studying the performance of roller bearings under the extremely severe conditions encountered in gas turbines. They have discovered two significant facts.

One is that the principal source of difficulty in bearings under such exacting conditions lies not in the steel races, nor in the steel rollers, but in the roller separators or retainers. The second is that these separators or retainers, which usually are made of free-machining yellow brass, when plated with silver, are capable of operating several hours without lubrication before failure. Unplated brass retainers fail in a matter of minutes under similar conditions. Apparently the silver plating reduces the transfer of brass particles to the steel components under poor lubricating conditions.

These efforts to learn what is necessary to meet the challenge of high speeds, high loads and high temperatures are timely. These exacting requirements will be typical tomorrow.

—p. 61

* * *

SAFER STEEL TRUCKING: It would be unwise to underestimate the importance of the conferences being held to promote safety in the highway trucking of steel. In areas where the traffic of steel trucks is heavy, public opinion has been aroused by the frequency of accidents in which steel carriers have figured.

A task committee, appointed as a result of a conference called by the Bureau of Motor Carriers, Interstate Commerce Commission, early in July, last week in Cleveland recommended that improved safety in steel transport be achieved through voluntary action rather than through restrictive ICC regulations. This sound proposal puts it squarely up to the carriers to inaugurate measures immediately which will insure a better fastening of loads to trucks, greater protection of drivers against the peril of shifting loads

and the greatest possible safety for the traveling public.

—p. 33

* * *

COMBATting SILICOSIS: During the past third century industry has made commendable progress in minimizing the hazards of silicosis. In the manufacture of electric steel, the problem centers around the work of laborers who unload brick from cars and bricklayers who handle and scutch brick in the process of renewing furnace tops.

Timken Roller Bearing Co. has adopted a program which solves this problem effectively. For years the company has refrained from using silica brick which requires scutching. Instead it uses prefabricated brick. Also the company sprays all brick with oil in an enclosed spraying machine. This eliminates dust in the handling of brick. A third precaution is to install a dust separator in connection with the electric saw employed in cutting brick. A fourth is to suck dust mechanically from a car while brick is being unloaded. A fifth is to ship brick in cars on pallets, thus further reducing the dust.

These are relatively simple precautions, but they pay off in real health records.

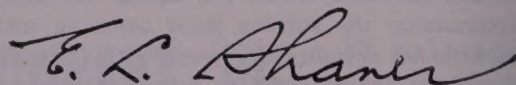
—p. 72

* * *

MUSIC TEACHER'S \$1500: Although typical American "success" stories are plentiful, it would be difficult to match the drama of the modest beginning and spectacular rise of the Dayton Engineering Laboratories Co. Forty years ago Col. E. A. Deeds, William A. Chryst and Charles F. Kettering launched this corporate infant with meager facilities in a barn loft on Central avenue in Dayton, O. The company was financed by mortgages on Colonel Deeds' property, loans on Kettering's life insurance policies and \$1500 Mrs. Kettering had saved from her earnings as a music teacher.

From this modest start Delco has expanded into what now constitutes four major manufacturing divisions of General Motors Corp. The development of these enterprises has been beneficial to thousands of investors, employees, suppliers and others. It is the traditional American formula of enterprise, resourcefulness and risk-taking. If the incentives for this kind of enterprise are destroyed—intentionally or unconsciously—the driving force which has made this country great will become impotent.

—p. 43



EDITOR-IN-CHIEF



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Unemployment Study Launched

Commerce Secretary Sawyer begins nation-wide survey in New England. Data will be used to determine critical areas of surplus labor requiring governmental aid

ON-THE-SPOT fact-finding study of economic conditions was launched last week by the Department of Commerce as the first step in developing a government program aimed at eliminating "pools" of unemployment at various points throughout the country.

Commerce Secretary Sawyer personally sets the survey in motion this week when he meets with New England business leaders at Boston.

Findings of the survey will be reported to the 20-man committee set up by President Truman to cope with the unemployment problem. This committee, headed by Dr. John R. Steelman, presidential assistant, will utilize the data in determining those surplus labor areas where government spending and construction activities should be centered or stepped up to relieve distress.

No New Spending—No additional public works spending is planned. No defense contracts will be diverted from areas of high employment to distress points, but if a new contract is pending efforts may be made to

place it in a surplus labor area.

Joblessness, while rising for months past, has not reached a critical stage from the overall standpoint. Mid-May government study of 98 large production areas indicated the nation as a whole had an unemployment rate of 6 per cent, a moderate surplus. However, ten production centers had unemployment volumes of 21 per cent or more of their labor force.

New England Hit — Of the ten areas considered most critical five are in New England. Other areas are: Knoxville, Tenn., Scranton-Wilkes Barre, Pa., Muskegon, Mich., San Jose, Calif., and Rome-Utica, N. Y.

Initial report of the Subcommittee on Unemployment of the Joint Committee on the Economic Report, just issued, states every industrial state has felt the rise in unemployment, with New England hardest hit. Other areas with heavy unemployment are New York, New Jersey, Maryland, the Carolinas, Kentucky, Tennessee, Alabama, Illinois, and California. In some states in the Midwest, unemployment is fairly low.

Curtailments or shutdowns in textile mills and plants producing metal goods, tools, jewelry, electrical products, etc., are cited as causes for increased unemployment in the ten areas singled out as most in need of government assistance in reinvigorating business.

The report of the Joint Committee on the Economic Report states in the first six months this year non-agricultural employment dropped about three-fourths of a million from last year's comparable levels, to an average of slightly over 50 million. By June, the difference had widened to about 2 million.

Steel Employment Off — Heaviest drops were in textiles, and in metals groups exclusive of automobiles. Employment in textiles was off 200,000, or 15 per cent, from the peak. The nonelectrical machinery industry was off about 200,000, or 12 per cent, from the peak. Of late, heaviest drops have been in iron and steel, down some 200,000, or 11 per cent

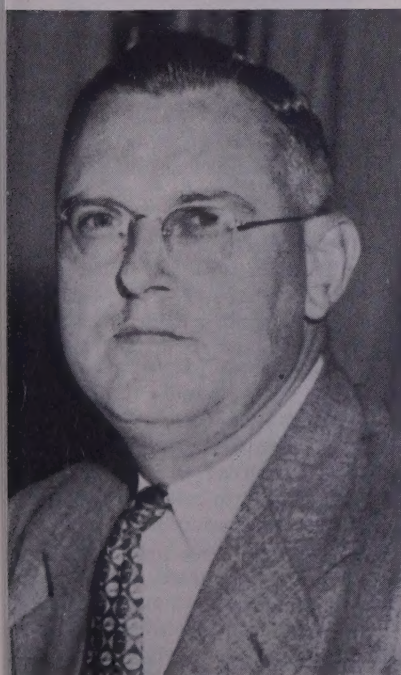
from the peak attained last fall. Other fields experiencing sizable employment declines since early 1948 include electrical machinery, down 120,000, and nonferrous metals, off 70,000.

The committee found leather and textiles are the only major groups which have declined to near their 1939-40 levels. Employment in iron and steel industries is about 50 per cent above the 1939-40 level, and in the machinery group it is nearly double.

Suggests Stabilizing Program

ANSWERING Robert R. Nathan's advice to the Congress of Industrial Organizations that a fourth round of wage increases can be granted by profitable industries without a resulting increase in prices, Herman W. Steinkraus, president, Chamber of Commerce of the United States, and president, Bridgeport Brass Co., Bridgeport, Conn., told a luncheon press conference in Washington last Monday that the Nathan program, if adopted, would bring "higher wages for a few and higher prices for all."

Reductions Reflected—Raw materials have gone off 36 per cent from the peaks, and wholesale prices on commodities have fallen off about 10 per cent, said Mr. Steinkraus. These reductions are beginning to be reflected sharply in current retail



John R. Steelman



Herman W. Steinkraus

prices which are due to continue downward for months to come. Unfortunately, he said, the Nathan report has delayed this trend temporarily as many manufacturers and merchants, frightened by the demand for further wage increases, are postponing the lowering of prices.

Suggests Wages Hold—Mr. Steinkraus said he believed a sound solution of present economic conditions is for wages to hold steady and for labor to refrain from further demands at this time, while price reductions should be made by manufacturers, wholesalers, and retailers as rapidly as possible.

In his statement to the press, Mr. Steinkraus proposed a program for business, labor and government for the immediate future.

Proposed For Business: 1. Reduce prices as rapidly as possible to reflect reduced cost in materials and increased efficiency of labor and machinery; 2. increase sales and advertising efforts; 3. bring out new products; 4. retain good relations with workers and the unions.

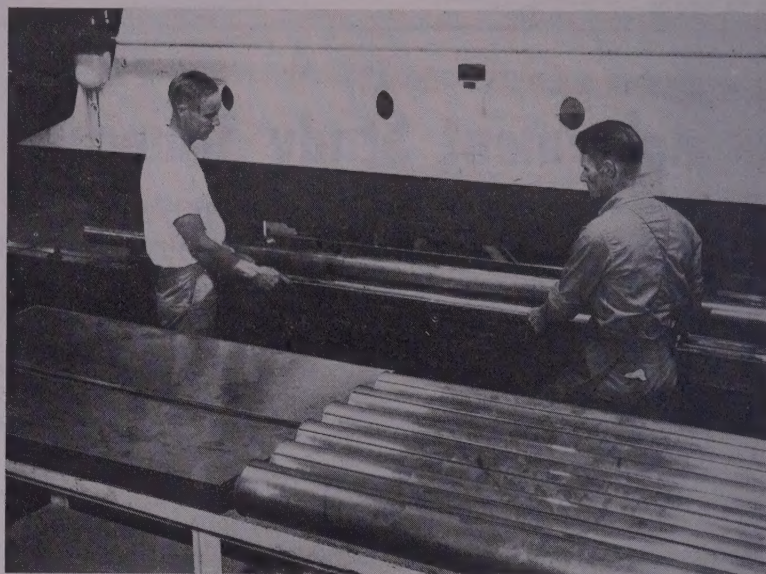
Proposed for Labor: 1. Forego demands for increased wages at this time and permit the economy to be stabilized so that public confidence may return to the market; 2. assist management in every reasonable way to bring costs down through greater efficiency; 3. recognize the simple fact that the greatest security for the worker is a steady job at good wages.

Proposed for Government: 1. Permit an orderly readjustment of the economic situation and recovery from the distortions of the war and post-war period; recognize there is a leveling off to a more balanced peacetime economy with narrow margins of profits, with prices to go lower for several years; permit the market to operate competitively; 2. the government must exercise economy and increase its efficiency; the entire tax structure should be restudied with a view to stimulating incentives for business growth.

Keyserling Calls for Expansion

STEADILY expanding economy with a goal of \$300 billion in national output within a few years was called for last week by Leon Keyserling, vice chairman, the President's Council of Economic Advisers, addressing a meeting of Americans for Democratic Action.

Mr. Keyserling said that while the nation is in no economic emergency which would make necessary the rushing pell mell into an improvised program of action, still the economy



FASTER FLANGING: Saving of five to six minutes per section on end-flanged ducting for B-36 bombers has been achieved at Texas Engineering & Mfg. Co. Inc., Dallas, by an advanced power brake technique developed by the company's power brake section. Formerly, the end-flanges were hand formed, after side flanges were made on power brake. New technique eliminates hand-forming and flanges ends on power brake at the same time side flanges are formed

is not self stabilizing and that a long-range program is needed to insure full employment and production.

Seven areas where the expansion program should be concentrated were detailed by Mr. Keyserling as follows:

- 1—Improve standards of living; 2. adoption of the Brannan farm plan; 3. an appraisal of the amount of expansion in basic industries and transportation systems which will support a \$300 billion economy; 4. resource development and expansion of society security and health and other welfare activities; 5. a foreign economic policy geared to a domestic policy at expanding levels of output and income; 6. revision of the tax system to provide sufficient reserves and still offer business incentives to help achieve the output goal; 7. wage, price and profit policies of private enterprise geared to the concept of economic expansion.

Manufacturing Profits Decline

NET INCOME after taxes of manufacturing corporations was estimated at \$2.4 billion in the first quarter of this year, according to a joint report of the Securities & Exchange Commission and the Federal Trade Commission.

This was approximately 18 per cent below that of the preceding quarter and about 16 per cent below the corresponding quarter of 1948.

The decline reflects a drop in sales more than offsetting lower costs and expenses.

Big Corporations Hit—The decline in profit rate was experienced by the larger size classes of corporations. The ratio of profits after taxes to stockholders' equity for corporations over \$100 million in assets dropped from an annual rate of 18.2 per cent in fourth quarter last year to 14.4 per cent in first quarter this year. Similarly corporations with assets between \$5 million and \$10 million showed a decline from 16.2 per cent to 12.0 per cent. In contrast, the smallest size class, corporations with less than \$250 thousand in assets showed an increase, from a small loss to 8.4 per cent.

On an industry basis all but two of the 22 industry groups showed declines in profits after taxes from the fourth quarter of 1948 to the first quarter of 1949. The largest reductions were shown by manufacturers of rubber products, textile mill product and fabricated metal products, each of which had profits 30 per cent or more below those in the fourth quarter of 1948.

For the first three months of 1949 sales of all manufacturing corporations aggregated \$39.4 billion, about 8 per cent below total sales in the preceding quarter, while costs and expenses were estimated at \$35.4 billion, a slightly smaller decline.

Panel Gets Steel Case

Questions of bias, future of collective bargaining, prices arise as hearings approach

FOUR major questions arose in the minds of steel and metalworking executives last week as they pondered the handling of the steel wage dispute, which this week goes to hearings before a special Presidential fact-finding board. They are:

1. Is the special fact-finding board appointed by President Truman likely to be biased in favor of the unions? Opinion is divided. Many industrialists believe the board has a distinct "New Deal" tinge, that it will return recommendations favorable to the unions and thus enable President Truman to pay off his alleged

debt to organized labor. Others hope that a majority of the board will attack the problem impartially.

2. Is this procedure the first step in breaking down free collective bargaining? Since the board is charged with making recommendations for the settlement of the dispute, some observers hold that the position of the parties to the dispute will be prejudiced by the board's recommendations before they have had an opportunity to negotiate upon the facts reported by the board. If this procedure becomes established, they point out, either party to a dispute may make unreasonable demands and then await the appointment of a fact-finding board. Such a settlement may become largely political; a pro-labor administration may appoint a fact-finding board which is pro-labor or a pro-industry administration might ap-

point a board which would lean heavily toward industry.

3. Will steel prices remain frozen until after the fact-finding board makes its report and the issue is finally resolved? Many steel consumers have been anticipating price reductions should a fourth round wage increase be avoided. Industry spokesmen have insisted that the economy, at this juncture, needs price reductions and expanding production rather than wage increases. Now the uncertainty as the settlement of the wage dispute is prolonged to the middle of September and a chain reaction of price reductions that might be touched off by adjustments in steel prices may be delayed.

4. Will the settlement in the steel industry become a national pattern?

The fact-finding board will open hearings in New York July 28.

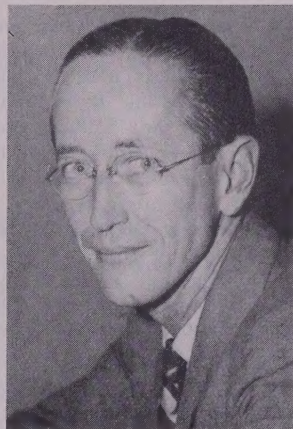
Fact-Finders Who Will Make Recommendations in Steel Labor Dispute



DAVID L. COLE



SAMUEL I. ROSENMAN



DR. CARROLL R. DAUGHERTY

DR. DAUGHERTY, chairman of the fact-finding board, is professor of business economics at Northwestern University, Evanston, Ill., previously taught at University of Pittsburgh, Wharton School of Finance, and other schools. Associates and former students generally regard him as a popular and penetrating professor and moderate liberal.

Dr. Daugherty has been a student of the economics of the iron and steel industry for nearly two decades and in 1937 wrote a two-volume, 1157-page analysis under that title. From 1934 to 1935, he was economist on labor conditions in the iron and steel industry under NRA for the University of Pittsburgh Bureau of Business Research. In 1936 he was principal economist for labor productivity studies conducted by the U. S. Bureau of Labor Statistics, and from 1938 to 1940 was chief economist for the Wage-Hour Division, Department of Labor. From 1944 to 1946, Dr. Daugherty was wage stabilization director for the National War Labor Board.

MR. ROSENMAN is best known as a member of

the Roosevelt "brain trust" and as a special adviser and speech writer for President Roosevelt and President Truman. He became special counsel to Mr. Roosevelt in 1929, when the latter was governor of New York. In 1932, he was appointed justice of the New York Supreme Court. In 1943, he was appointed special counsel to President Roosevelt and after the latter's death in 1945 continued in the same capacity with President Truman until 1946. He now is practicing law.

MR. COLE, like Mr. Rosenman is a lawyer, and has been active in labor relations since 1926. He is listed as a Republican in Who's Who and at various times has served as counsel for textile manufacturers' groups and for banks. He was public member of the War Labor Board in 1943-45 and was chairman of a WLB panel for the iron ore industry dispute in 1944. Mr. Cole most recently attracted attention as an arbitrator in a dispute between the CIO's Newspaper Guild and the New York World Telegram in which he denied the union a wage increase. He lives in Paterson, N. J.

Monopoly Probers

Told to investigate management-labor relations that limit output or restrain competition

LABOR-MANAGEMENT relations may come in for study by the special House Judiciary Subcommittee which is conducting a new probe of the effectiveness of existing anti-trust law legislation.

At any rate, the idea was thrown at the group by Dr. John D. Clark, member of the President's Council of Economic Advisers, in testimony pointing out that among many angles that the subcommittee might look into was the matter of labor-management relations which limit and increase the cost of production or restrain competition.

Citing the action of John L. Lewis in ordering a short work-week in the coal mines, Dr. Clark warned that this sets a dangerous precedent for production controls in other large industries.

Restrictive Action—There are many restrictive practices, Dr. Clark said, and to them there has now been added the interesting determination by coal miners that mining operations shall not continue more than three days a week. Action of the coal miners has brought about the same result as would have followed collusive action by the coal producers and which they declined to do since they would violate the Sherman act. The coal miners are not bound by this act.

The monopoly probe promises to have far-reaching effects on the future organization and conduct of American business.

Answers President's Call—In part the investigation is in response to the call by the President, in his State of the Union message in January, for congressional action "to strengthen our anti-trust laws by closing those loopholes that permit monopolistic mergers and consolidations." But also, the investigation results from a growing feeling in Congress that existing anti-trust laws have not prevented the lessening of competition and have failed to prevent harmful dominance of business in general by large interests.

It was this feeling in Congress that caused trouble for the O'Mahoney delivered price bill in both House and Senate. The great majority of congressmen were entirely willing to declare the legality of freight absorption to meet competitive prices, but they wanted the bill so worded as not to present loopholes for conspiracy and lessening of competition.

ANTI-TRUST LAW ENFORCEMENT CASES RISE

IN A QUIET manner, the significance of which has escaped general public notice, both the Department of Justice and the Federal Trade Commission have stepped up anti-trust law enforcement activities over past months to an unprecedented degree.

The following lists cases instituted by the Department of Justice this year:

At Newark, N. J., on Jan. 14, against Western Electric Co. and American Telephone & Telegraph Co., on charges of violating the Sherman Act in the distribution and sale of telephone equipment, materials and supplies.

At Boston, Jan. 28, against four manufacturers, alleging monopoly in the coated abrasives business.

At Philadelphia, Feb. 2, against the wholesale wallpaper industry, alleging the fixing of discounts, allowances and other terms.

At Trenton, N. J., Feb. 16, against the Sand Spun Patents Corp., American Cast Iron Pipe Co., Florence Pipe Foundry & Machine Co. and the Warren Foundry & Pipe Corp., alleging monopoly in the production and sale of cast iron pressure pipe.

At Philadelphia, Apr. 25, against wholesale cleaners and dyers, alleging price fixing in the Philadelphia area.

At Detroit, Apr. 28, against Besser Mfg. Co., alleging monopoly in the manufacture and sale of concrete block machinery.

At Philadelphia, May 6, against linen suppliers, alleging price fixing in the linen supply service business.

At New York, May 24, against Univis Lens Co., alleging price fixing on multifocal eyeglass lenses.

At Seattle, May 26, against Northern Pacific Railway Co., seeking to stop sale of land subject to a guarantee that the purchasers would patronize that carrier exclusively.

At Cleveland, May 31, against 14 building materials dealers in Cleveland, alleging price fixing on building materials.

At Detroit, June 7, against the Gray Iron Founders' Association and eight corporations, alleging price fixing on gray iron castings in the Detroit area.

At New York, June 10, against Austenal Laboratory Inc., alleging monopoly in the manufacture and sale of dental alloys.

At Los Angeles, June 16, against carbon dioxide fire extinguisher industry, alleging price fixing.

At San Francisco, June 22, against plumbing and heating wholesalers, alleging price fixing.

At Laredo, Texas, June 23, against ice manufacturers, alleging conspiracy to control prices and establish monopoly.

At Chicago, June 23, against the plastic artificial eye industry, alleging price fixing.

At Chicago, June 30, against E. I. duPont de Nemours & Co., General Motors Corp., and United States Rubber Co., alleging conspiracy in development, production, manufacture, distribution and sales.

At Philadelphia, July 13, against four kitchen equipment manufacturers, alleging elimination of competition in Pennsylvania, New Jersey, Delaware and Maryland.

Also at an unusually high level of activity is the Federal Trade Commission's enforcement program under the Clayton and Federal Trade Commission Acts. Here are the new cease-and-desist orders so far this year:

Against Crown Manufacturers Association, Washington, D. C., banning price fixing in sale of bottle caps.

Against Connecticut Leather Findings Association Inc., Waterbury, Conn., banning price fixing on rubber soles and heels.

Against Association of Coupon Book Manufacturers, New York, banning combination to fix prices and suppress competition in sale of tickets, coupons, hat checks, etc.

Against National Pressure Cooker Co., Eau Claire, Wis., banning exclusive dealing contracts and coercive methods to enforce them in sale of pressure cookers and canners.

Against Bobbin Manufacturers Association, Boston, banning price fixing and suppression of competition in sale of bobbins.

Against American Shovel Manufacturers Association, Allentown, Pa., banning price fixing.

Federal Trade Commission this year also has issued complaints, for alleged violations of the Clayton or Federal Trade Commission Acts, or both, against the following, on the charges mentioned:

Gamble-Skagmo Inc., Minneapolis, exclusive dealing contracts and coercive enforcement methods.

Lever Bros. Co., Procter & Gamble Co. and Colgate-Palmolive-Peet Inc., price discrimination in sale of soap.

National Paper Trade Association, New York, price fixing on fine and wrapping paper.

Thirty candy manufacturers, price discrimination.

General Motors Corp., sales and pricing practices in restraint of trade in automobile accessories.

Florida Citrus Canners Cooperative, Lake Wales, Fla., price discrimination in the sale of canned citrus juices.

Bib Mfg. Co., Macon, Ga., and others, price fixing in twine products.

Dictograph Products Inc., New York, exclusive dealing contracts in hearing-aid devices.

Malleable Chain Manufacturers Institute, Chicago, conspiracy to fix prices on malleable chain.

Electric Auto-Lite Co., Toledo, O., price discrimination and unlawful maintenance of resale prices of spark plugs.

Washington Brewers' Institute, Seattle, price fixing on sale of beer.

Middle Atlantic Distributors Inc., Washington, D. C., unlawful maintenance of resale prices on liquor.

Cycle Jobbers' Association of America, Boston, conspiracy to eliminate and suppress competition in sale of bicycles and parts.

American Dental Trade Association, Washington, D. C., conspiracy to eliminate and suppress competition in sale of dental goods.

Ideal Cement Co., Denver, and Monolith Portland Cement Co., Los Angeles, (separate complaints), price discrimination by charging 20 cents a barrel more for truck than for rail delivery.

Lower Sheet Freight Rate

Between Cleveland and Detroit under consideration by New York Central Railroad

THIRTY-THREE per cent reduction in the rail freight rate on steel sheet shipments between Cleveland and Detroit is under consideration by the New York Central Railroad. The proposal is made as a step in meeting increasing competition from truck and combined boat-truck shipments at lower rates.

The current freight rate on steel shipped from Cleveland to Detroit is 36.04 cents per 100 pounds. A reduction of 33 per cent would bring this down to around 24.14 cents, or about the level of combined truck and boat rates, or direct truck rates.

Proposal Studied—Lowering of the Cleveland-Detroit rate might result in pressure from steel shippers at other points, Youngstown for instance, for similar lower rates.

Consequently, New York Central traffic experts are exploring the matter thoroughly before taking definite action. It is pointed out application of a lower rate, should it be decided upon, could be delayed by the filing of protests with the Interstate Commerce Commission.

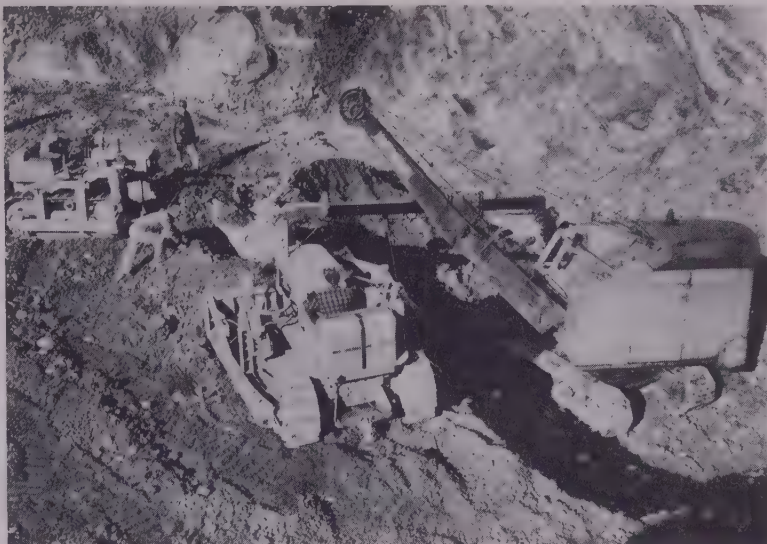
Last week it was announced by the New York Central that it was extending its combined rail-truck service to cover Ohio, Indiana and Illinois. This service, which is confined to less than carload shipments, only involves rail shipments between key points and truck shipments to way stations.

Recommend Steel Hauling Code

VOLUNTARY action rather than ICC regulation for increased safety in shipping steel by truck was the course of action recommended by the task committee which met in Cleveland, July 18 and 19. This committee was appointed as a result of the conference called by the Bureau of Motor Carriers, Interstate Commerce Commission, early in July (STEEL, July 18, p. 56) and which included representatives of steel shippers, haulers and vehicle manufacturers.

Details of the committee's recommendations will be announced in the near future and will have to be approved by the interested groups as well as the ICC. In addition to better protection for the public, recommendations were made for increased protection for the carriers.

Representing the steel industry on the task committee were W. E. Fowler, general traffic manager, Youngstown Sheet & Tube Co., Youngstown,



RECLAIMING SCRAP: Steel scrap discharged from the open hearths in a Cleveland steel mill is shown being reclaimed, during the scrap shortage, by the use of the Allis-Chalmers bulldozers. Some of the pit scrap is buried 300 feet under the surface

and J. W. Hoover, general traffic manager, Carnegie-Illinois Steel Corp., Pittsburgh, serving as advisers. The Bureau of Motor Carriers' representative was L. Resnek.

Uniform Trucking Laws Sought

CONFERENCE on uniform legislation covering trucking weights has been tentatively scheduled for Sept. 22 and 23 in Columbus, O. Governor Lausche of Ohio plans to invite highway officials of Michigan, Indiana, Illinois, Kentucky, West Virginia, Pennsylvania, New York, Delaware, Maryland and New Jersey, as well as representatives of truck manufacturers and trucking associations to the meeting. Means of eliminating the conflict in provisions of state laws, which has hampered the flow of truck traffic across state lines, will be discussed.

New weight legislation in Ohio includes a new weight penalty schedule while another proposed bill would increase the permissible weights of trucks. The bill now awaiting Governor Lausche's signature and which will become effective Oct. 18 provides a \$25 fine for the first 2000 pounds overload; \$25 plus \$1 a hundred pounds for overloads of 2000 to 5000 pounds; \$25 plus \$2 a hundred pounds plus up to 30 days for all overloads in excess of 10,000 pounds.

Proposed legislation in Ohio also would increase legal weights from 18,000 to 19,000 pounds on a single axle; from 30,000 to 31,000 pounds on a tandem axle. Top legal gross would remain at 78,000 pounds. A

modified bridge formula section would allow 38,000 pounds plus 800 per foot of vehicle instead of the present 36,000 pounds plus 750 pounds per foot.

Seek Freight Rate Cut

Railroads reported favorably inclined toward 25 per cent reduction on ferrous scrap

RAILROADS are reported as giving consideration to the requests of scrap dealers for lower freight rates on ferrous scrap.

What the dealers want is a 25 per cent decrease in the rates that prevailed before the Interstate Commerce Commission several months ago temporarily granted a 6 per cent increase pending a decision in Ex Parte 168 involving the railroads' request for a 13 per cent increase in freight rates generally.

The scrap dealers propose a straight 25 per cent reduction in the former rates so that there will be no dislocation in the prevailing pattern.

Rates Too High—Argument of the dealers, as presented by the Institute of Scrap Iron & Steel Inc., is that present prices of scrap will not stand the current railroad freight rates, let alone the contemplated 13 per cent increase which already has been placed in effect temporarily in part.

On the railroad side there seems to be a disposition to grant rates that will retain this lucrative business rather than risk the loss of a large part of it to truckers.

Pressed Metal Convention

Featured by business and technical discussions. New officers elected

MORE than 200 members of the Pressed Metal Institute attended the annual convention of the organization held in Cleveland July 20, 21, 22. Recognizing that a new era in the stamping industry is here, the primary aim of the meeting was to develop an industry plan so that the fundamentals of sound business will prevail among stampers despite competitive situations, national emergencies or other challenges.

The three day meeting was crowded with business and technical sessions. The opening day of the convention was devoted to committee meetings and a tour of Republic Steel Corp.'s continuous mill. On Thursday, Walter A. Gorrell, president of the association, presided at the opening business session, and Raymond Peterson, Peterson Engineering Co., Toledo, O., at the afternoon technical session. Subjects at the latter included metal spinning's place in the stamping industry, deep drawing of aluminum, seniority and job preference, and school aid in the training of engineers.

Orrin B. Werntz, managing director of the association presided at the Friday morning session at which a variety of general business subjects were taken up, including the position of small business in the economy. At the Friday afternoon session reports of various committee chairmen were presented.

Ten Englishmen, comprising a production team touring American pressed metal plants, were guests of the association at the meeting. Led by James M. Phillips, managing director, Motor Panels Ltd., Coventry, England, the group participated in the various sessions.

New President — Woodard G. Jeschke, president, Res Mfg. Co., Milwaukee, was named president of the Institute. Other officers selected were Howard Wolf, vice president, and Joseph J. Boehm secretary-treasurer. Mr. Wolf is assistant to the president of Mullins Mfg. Corp., Salem, O. and Mr. Boehm heads the Boehm Pressed Steel Co., Cleveland.

At the annual banquet Certificates of Merit, recognizing service to the industry, were presented to four former presidents of the Institute: George Whitlock, president of Mullins; F. C. Greenhill, president of Acklin Stamping Co., Toledo; Clarence Custer, president of American

Stamping Co., Cleveland and Walter Gorrell, Philadelphia, who passed his gavel of office to Mr. Jeschke at this meeting.

Pricing Bill Further Delayed

SENATE action on the O'Mahoney freight absorption bill, covering delivered pricing in industry, has been further delayed. The bill, passed by the House July 7 in different form than passed by the Senate weeks earlier, will not be taken up for final action until after the North Atlantic Pact debate in the Senate has been cleared away.

There is some question whether the bill in its present shape will go to Senate-House conference. Sentiment has changed in the Senate since it was passed by that body with many senators who originally favored the measure now opposing it. While there is a chance the bill may be killed on the Senate floor, some observers think the House bill with the Carroll amendment will be finally accepted by the Senate.

Problems Discussed

At midyear meeting of Scrap Institute include credit bureau, trade practices and exports

RECOMMENDATIONS that a Credit Bureau and a Fair Trade Practices Bureau be established within the organization were made at the mid-year meeting of the Institute of Scrap Iron & Steel Inc., held at Atlantic City, N. J., July 17-19.

Another important recommendation was that scrap exports be open-ended in view of the surplus scrap supply, the need for activation of the collection machinery, and the importance of preserving the small business interests of the industry.

Expect Demand Gain — Although the drastic change from a seller's market a year ago to the present buyer's market was discussed widely, consensus of the more than 400 members attending the meeting was that demand will show considerable improvement if a prolonged steel strike can be averted this fall and operations maintained at a reasonable rate.

During the period of truce between the mill operators and union, it is believed that buying will be maintained only on a hand-to-mouth basis. If mill inventories of scrap are low at the beginning of winter, a further improvement in the scrap market is likely.

Urges Credit Bureau — Walter I. Bregman, president, Price Iron &

Steel Co., Chicago, and chairman of the institute's Brokers' Committee strongly urged the establishment of a credit bureau. The proposed bureau would compile complete information on every consumer and purchaser of scrap and would be available to all members within a period of 24 hours. Suggested financing for such a bureau was as follows: An assessment of each member of \$30 the first year and \$15 per year thereafter.

Benjamin Schwartz, Benjamin Schwartz Co., New York, submitted the recommendation, in behalf of the Export-Import Committee, that scrap exports be open-ended. The belief was expressed that scrap should receive the same treatment as pig iron and all finished steel items, except galvanized sheets, which have been open-ended for export without quotas, subject to regulations dictated by national security.

Fair Trade Practices — Mr. Schwartz also submitted a recommendation for the creation of a Fair Trade Practices Bureau which would study and implement a program to eliminate unfair trade practices. The question of unfair trade practices in the handling of scrap has developed, Mr. Schwartz said, in direct dealing in certain trade customs, in contractual terms, in certain service organizations.

William Pohn, chairman, Yale Dealers' Committee, discussed a plan to request the steel mills to accept No. 3 bundles (coated materials) at a differential from superior grades.

Golf Club Volume Holds

GOLF club manufacturers have not yet felt a marked business recession and expect 1949 production will close to the 1947 production of 3,860,000 clubs.

L. B. Icely, president, Wilson Sporting Goods Co., Chicago, explains that most of the 1949 wholesale orders were booked in the fall of 1948. Volume for 1950, to be booked this fall, will probably decline. Overseas demand is heavy, but shipments are held to low levels by dollar shortages. Competition in the United States from foreign producers is slight. Wilson's inventories of raw materials and component parts range from 30 to 90 days.

Subcontracting is widely practiced in the industry. Wilson obtains shafts from True Temper Corp., Cleveland, and also subcontracts rough forgings for golf heads. One of two of the major companies, A. Spalding & Bros. and Kroyden Co. have their own forging facilities. Wilson's shafts are chromium plated alloy tubing, weighing 4 ounces.

Expect Foreign Demand

For machine tools to be adversely affected if ECA appropriation is trimmed by Congress

HOPE for an increased volume of foreign orders for machine tools under an increased Economic Cooperation Administration allotment is fading.

The ECA budget originally called for an increase to \$75 million for the current fiscal year from \$50 million in the year just ended. Congress, however, is expected to trim the appropriation. The Senate Appropriations Committee voted \$3,778,380,000 for the program, 10 per cent less than asked by the President. The House previously approved a budget of \$3,568,470,000 but allowed ECA to spend it in 10½ months if necessary.

Machine tools' portion of the total appropriation is small but is expected to be trimmed along with other items. In the first 15 months of ECA, orders for American machine tools, including some presses, totaled \$61,851,000. According to the National Machine Tool Builders' Association, very few foreign orders were placed except under ECA.

Britain's monetary maneuverings with the aim of improving her financial position are also expected to have an adverse effect on the foreign market. Trade agreements reducing purchases from U. S. firms could easily knock the props from under the foreign demand for tools, which has been stronger in recent months than it has since the war.

Tool Men Go Back to School

NEARLY 350 sales managers, district managers and salesmen for members of the National Machine Tool Builders' Association and the American Tool Distributors' Association are back in college this summer taking a full week of instruction in salesmanship.

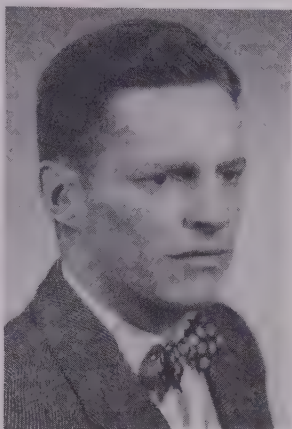
This week 89 sales executives are registered at Western Reserve University. Earlier this month a similar number, representing eastern manufacturers in the machine tool field, attended a parallel course at Cornell University. The week of Aug. 8 to 13, another group will be at Dartmouth College, taking the same course at Thayer School of Engineering, and from Aug. 15 to 20, the final course will be at Purdue University.

These summer conferences on sales engineering are the first comprehensive program in the nation devoted exclusively to the sale of capital goods and utilizing the faculties of recognized colleges as instructors. The conferences are the outgrowth

of a single experimental course of this nature held at Cornell last year.

Subject matter of the course ranges from the fundamentals of machine tool selling through market research and product survey, with special attention to tooling-up, work simplification, machine layout, materials handling and engineering economy. It covers engineering types of analysis involved in the selection of machine tool equipment, and the sales procedure to be used in presenting information on the use of specific tools for specific jobs.

The course is presented through the co-operation of NMTBA, the American Tool Distributors' Association and the four colleges, the committees in charge representing the outstanding figures in the machine tool industry.



J. L. VanNORT

American Machines Aid Recovery

REHABILITATION and modernization of European plants is proceeding most rapidly in those steel, paper and textile industries where American machines, equipped with engineered drives and built-in precision electric controls, are making possible higher operating speeds than were previously possible. This observation was advanced by J. L. VanNort, application engineer for Reliance Electric & Engineering Co., Cleveland, upon his return from a five-week trip to England, Sweden, Finland, France and the low countries.

Mr. VanNort reported he found considerable revival underway in French and Italian textile mills and a growing appreciation everywhere outside the Iron Curtain countries for American engineering "know-how" and equipment.

During his visits to plants in England and on the Continent, he checked on Reliance sales and service outlets and renewed acquaintance with outstanding European engineering firms. His itinerary was so arranged he was

able to be present in Kauttua, Finland, for the start of the first Reliance-driven super calender to be installed in the plant of the A. Ahlstrom Co., a leading Finnish paper mill.

Airborne Sales Tour

SEARCH for foreign business will in the next four months lead Sam Keener, president, Salem Engineering Co., Salem, O., and a staff of engineers to 30 cities in Europe, Africa and Asia. Salem Engineering designs and builds industrial plants ranging from those for food processing to steel mills.

This 50,000 mile, round-the-world sales tour of 24 countries in a civilian version of a B24 Liberator grew out of a similar airborne sales coverage of Europe last year that brought Salem \$3.5 million worth of orders. In addition the volume of foreign inquiries handled by the firm has tripled since the first flight.

A number of companies have already signified their desire to confer with the Salem delegation when they are in the area. Mr. Keener believes that many other interests in underdeveloped areas will make conference appointments and the resulting business will make this venture as worth while as last year's European trip.

Monarch Shipping 56 Lathes

MONARCH Machine Tool Co., Sidney, O., has sent abroad Willis Kuhlman, of its demonstration and service staff, to supervise installation of 56 lathes. Many of the machines carrying special tooling are currently being shipped to European countries. Mr. Kuhlman, before he returns to the U. S., will have spent several months in ten countries: England, France, Holland, Belgium, Norway, Denmark, Switzerland, Italy, Austria and Finland. About one-third of the 56 lathes have been equipped with a Monarch postwar development feature, "Air-Gage Tracer" controls.

Eaton Blades for Jet Aircraft

EATON Mfg. Co., Cleveland, has started production of stator blades for jet aircraft engines at its Battle Creek, Mich., plant. Production of blades for two jet engine makers is expected to be stepped up over the next two years necessitating an increase of 1200 to the work force at peak of production. The company, which supplies the automotive, home appliance and farm equipment industries, is continuing a research program to develop new products to broaden its line.

Windows of Washington

By E. C. KREUTZBERG

Washington Editor, ST

Marshall Plan beneficiaries bear major portion of cost for projects to rehabilitate their economies. U. S. pays 4 to 11 per cent of steel expansion programs

WHEN the Marshall Plan was under study, administration spokesmen assured Congress the plan would require the participating European nations to bear the greater portion of the expense of rehabilitating their economies. Some estimates were that Europe would pay 90 to 95 per cent of the bill, with the United States paying the remaining 5 to 10 per cent. The contention was that the 5 to 10 per cent to be contributed by the Americans would supply the needed spark to set the whole gigantic program in motion.

How has this expectation worked out? Unfortunately there are no overall figures on which to base an accurate comparison. However, information available indicates that the ratio of United States to European expenditures is not far out of line with expectations. Illustrations of the way total expenditures break down for typical projects may be afforded by the two biggest British iron and steelworks expansion programs in which the Economic Cooperation Administration is paying part of the outlay. These are the expansion programs of the Steel Co. of Wales and Stewart & Lloyd's.

U. S. Pays 11 Per Cent—Total outlay for the Steel Co. of Wales program is \$240 million. Of this total, \$36 million, is to be spent in the United States for equipment and technical assistance, and of the amount to be spent in the United States the Economic Cooperation Administration has agreed to pay \$27 million. Thus the United States contribution to the total cost is 11.25 per cent, the British paying 88.75 per cent.

For the Stewart & Lloyd's program the total outlay is \$64 million. Of this total, the amount to be spent in the United States comes to \$4,800,000, of which ECA will pay \$2,700,000. In this case the United States is paying a little over 4.2 per cent and the British the remainder.

These contracts, incidentally, were placed in the United States mostly in 1947 and 1948 before the Marshall Plan came into existence, and payment was to have been made in full by the British. It was after adoption of the Marshall Plan that ECA agreed to finance part of these previously negotiated transactions.

Equipment Ordered — Principal

equipment ordered for the Steel Co. of Wales, for installation at Margam & Trostre, will include an 80-inch continuous hot strip mill, a 45-inch, 2-stand, reversing slabbing mill, and a 21 x 53 x 48-inch, 4-high, 5-stand, tandem cold mill, plus auxiliaries. The contracts were placed July 10, 1947, with United Engineering & Foundry Co. at \$16 million which, by reason of higher production costs in the meantime, has been escalated to \$18.8 million.

Other contracts placed for the Steel Co. of Wales are as follows: To United Engineering & Foundry Co., at \$400,000, engineering plans for plate finishing equipment being manufactured by Davy & United Engineering Co. Ltd., Sheffield; to United Engineering & Foundry Co., at \$710,000, Morgoil bearings for the three above-mentioned mills; to American Locomotive Export Co., at \$400,000, five diesel-electric locomotives; to Automatic Transportation Co., at \$140,000, five heavy-duty, 30,000-pound, fork-type lift trucks.

For Stewart & Lloyd's the largest contracts were awarded, in December of 1947, and early in 1948, to the Babcock & Wilcox Tube Co., at \$560,000, for equipment for the manufacture of resistance-welded steel tubing; to the same firm at \$370,000, for "know-how" and for design drawings for tube-welding equipment to be manufactured in England; and to the Bucyrus Erie Co., at \$760,000, for an electric dragline excavator for stripping iron ore deposits at Corby.

Other Contracts—In addition, the following contracts for equipment and services for British steel plants were placed under the Marshall Plan in 1948: For Arthur Lee & Son, Sheffield, at \$120,000, to Waterbury Farrel Foundry & Machine Co., for a Sendzimir reversing cold mill for enlarging output of stainless steel strip, to be paid for in full by the ECA; for United Steel Companies Ltd., Sheffield, at \$1.1 million (of which ECA is to pay \$0.9 million), to Arthur G. McKee & Co., for designs, drawings and "know-how" for two blast furnaces being built in England.

Contracts still to be placed under the above programs include an elec-

trolytic tinning line for the Steel Co. of Wales.

Engle Bill Vetoed

PRESIDENT Truman's veto of so-called Contract Settlement Act, 1949 provides another object lesson as to why it is risky to do business with the government except under a firm contract. The bill, introduced by Rep. Clair Engle (Dem., Calif.) aimed at reimbursing miners—mainly manganese miners—for losses sustained during World War II in producing critical and strategic minerals.

Many of these outfits—usually individuals or small groups—went into the mining business in response to government appeals for help in that field. They received all sorts of assistance, such as RFC loans, and getting necessary equipment with the aid of priorities—but they did not have contracts. Then, when times were cheaper, high-grade foreign manganese again started to come into the country, the government threw the domestic manganese miners out of business by increasing the acceptable manganese content to a minimum they couldn't touch. So there they were with their new equipment, as the rug pulled out from under them.

The veto was based on the fact that the bill singled out one industry—mining—for reimbursement of losses and on the circumstance that "the principle that the government should compensate war contractors and volunteers acting without contracts, for losses sustained by them in activities related to the war has not been generally accepted."

Mr. Engle and other legislators who worked the bill through both Houses say the veto will make it impossible for the government to declare another emergency to persuade miners to produce high-cost critical and strategic minerals without firm contracts that will guarantee them against losses.

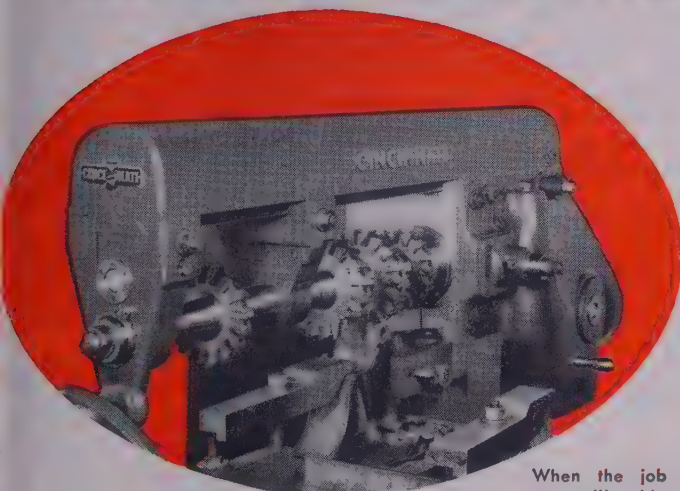
W. A. Janssen Retires

WALTER A. JANSSEN has gone back into business as an industrial consultant following his retirement from the Department of Commerce where he served since 1938. At that time he became chief of the Metals & Minerals Division of the Bureau of Foreign & Domestic Commerce; in recent years he has served the department as consultant on iron and steel, nonferrous metals and minerals, and

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nonmetallic minerals, and has worked closely with the War Production Board, Office of International Trade and other government units.

A graduate of the University of Wisconsin, Mr. Janssen spent 16 years in the steel casting business, with Bettendorf Co., Davenport, Iowa, Canadian Steel Foundries Ltd., Montreal, and American Steel Foundries, Chicago. From 1923 to 1938—except for a short period with the National Recovery Administration—he conducted a business as industrial consultant with offices in Chicago and Pittsburgh. His headquarters are in the Hotel Occidental, Washington, D. C.

Many Patents Available

PATENTS offered for general use continue to grow steadily in number and now run into many thousands. For the benefit of manufacturers looking for new products to be added to their lines, they are published regularly in the Patent Office's Official Gazette under the title "Register of Patents Available for Licensing or Sale." Latest additions include 16 General Electric patents on toasters and cooking apparatus and 40 on electric refrigerators; 84 Line Material Co. patents on high and low-voltage circuit interrupters; 15 Southern States Equipment Corp. patents on high-voltage circuit interrupters; 5 Hotpoint Inc. patents on toasters, electric heaters and timing devices and many others. Terms—usually described as "reasonable"—may be had by writing the patent owners.

Alaska Hydro Plant Proposed

ALASKA public improvements bill passed by the House July 13, and now in the Senate Committee on Interior and Insular Affairs, would authorize the construction of the proposed \$21-million Eklutna 30,000-kilowatt hydroelectric plant near Anchorage. It also would authorize continuing investigations as to further possibilities for developing more power and other natural resources in Alaska.

ECA Information Booklet Out

How to do business under the Marshall Plan is outlined in a new ECA publication, "Information for American Businessmen on the Marshall Plan." Sections of the booklet include: Selling under the Marshall Plan—ECA's procedure in providing dollar credits for European economic recovery; names, addresses, commodities and services of foreign purchasing missions; other foreign agencies doing administrative but no buying under the plan; U. S. government

agencies which have purchased commodities with ECA financing; and basic information sources for prospective exporters.

Copies of the booklet are available upon request from the Office of Information, ECA, Washington 25, D. C.

Record First Half Construction

BUREAU of Labor Statistics reports construction activity for the first half of 1949, as measured by value of new work put in place, was at a record high of \$8.5 billion, 4 per cent above expenditures for the first half of last year. Private expenditures of \$6.2 billion were 5 per cent under last year's January-June total, but public expenditures of \$2.2 billion were 37 per cent higher this year. State and locally financed construction was responsible for most of the gain in public expenditures, accounting for 71 per cent of total public dollar volume in the first six months of 1949.

Billion Dollar Export Loss

ESTIMATED losses of U. S. exports because of inadequate or improper packaging may total as much as a billion dollars annually, Office of International Trade announces. Many

U. S. industries are losing business abroad because their goods, although superior in quality, are arriving at foreign destinations in poor condition according to a report in OIT's "World Trade in Commodities" series. The report contains a comprehensive description of some of the complaints received through the U. S. Foreign Service concerning faulty packaging of export goods.

Navy Men in Industry

CONTINUING the summer training program started four years ago, the Navy Supply Corps has assigned procurement officers to as many companies that sell to the Navy. The purpose is to give the Navy men a better understanding as to how to do business with industries represented by these companies. The firms participating in the training program include Bethlehem Steel Co., Yale & Towne Mfg. Co., Pacific Oil & Foundry Co., Tidewater Associated Oil Co., Schlage Lock Co., North American Aviation Inc., Minneapolis Honeywell Regulator Co., General Motors Corp., Food Machinery Corp., Esso Standard Oil Co., and others.

Government Employment Mounts

IN MARKED contrast to the layoff of employees by private industry in recent months, government employment continues to mount. According to the latest report of Senator Byrd's Joint Committee on Reduction of Nonessential Federal Expenditures, civilians on the federal payroll at the end of May numbered 2,120,019 as compared with 2,110,000 at end of April. That was gain of 9490, or 431 new employees hired each working day.

Services Obtained for Sandia Base

U. S. Atomic Energy Commission has obtained the services of Western Electric Co. and Bell Telephone Laboratories for the operation of the Sandia Laboratory at Sandia Base, Albuquerque, N. Mex. The laboratory has been operated since 1945 by the University of California. Laboratory work will have an important function in bridging the gap between laboratory development work and the manufacturing of atomic weapons.

To Study Coal Reserves in West

AS PART of its study of the coal resources of the United States, the U. S. Geological Survey has contracted for 3000 feet of core drilling in the Centralia-Chehalis field, Lewis and Thurston counties, Wash., Director W. E. Wrather announced.



AMPUTEE WELDER: Disabled veterans demonstrated what they can do in industry at the Chicago Production Show. As part of the Veterans Administration exhibit, T. L. Caston shows that loss of a hand does not prevent him from handling welder's torch. NEA photo



ADOPTS DIESELS: Pittsburgh Steel Co. is converting to diesel-electric locomotives at its Monessen, Pa., plant in the interests of economy and efficiency. One of its new 80-ton locomotives, built by General Electric Co., Schenectady, N. Y., is pictured in operation at Monessen

Transportation Steel Needs Rise

European railroads, shipbuilders and automotive manufacturers hope to obtain larger tonnages. Current quotas considered inadequate by British interests

NOW THAT some branches of British industry are needing less steel, expectations are that quotas for shipbuilding and automaking will be increased.

British railways are engaged in an extensive program of replacement and maintenance. Projects in progress are: Electrification of new lines, building of tunnels, modernization of marshaling yards and introduction of color-light system of railway signaling.

Shipbuilding industry, still in throes of a steel shortage, is engaged in restoring the British dry-cargo fleet to its prewar level.

Italian shipbuilders expect to receive orders following the recent approval of a law which provides for some 260,000 tons of new construction of quality ships.

In the Netherlands two plants are producing automobile and truck tires, and although their joint production is small, it is expected to eventually meet a large proportion of the demand.

Western Germany produced 253,000 cycles the first two months of this year, about 80 per cent of capacity. Improved delivery of metal, formerly the chief bottleneck, and a good supply of tires were responsible for the high production rate.

Permission was given in the first quarter of the year to construct 12 vessels in Japan. Gross tonnage could be 41,840.

In South America, Brazilian tire manufacturers have set a 1949 goal

of 1.2 million tires and 900,000 tubes; output last year was 994,609 tires and 744,667 tubes.

Sheetmakers Under Pressure

BRITISH automakers, committed heavily with export orders, are pressing sheetmakers for greater output. Shipbuilders and automobile manufacturers still consider their quotas too small to meet contracts for new construction; both are calling for maximum supplies. Steel rail mills are well booked for the second half of the year. Tubemakers, too, have large orders.

May auto exports from Britain reached a new record of £6.5 million, more than £1 million above the monthly average target set for year-end. This is at the expense of the home trade; queues for automobiles in Britain are generally three years long. In May almost 2500 vehicles were sent to Canada, bringing the total to 8500 for the first five months of the year. Number sent to the U. S. was 263. Automakers do not expect that a serious fall in exports will take place. Vehicles for home markets will, therefore, continue in short supply.

More than 6000 British troops continue to load and unload ships along the miles of London docks. Prime Minister Attlee received a telegram from 16 Canadian union leaders declaring transportation units in Canada are not supporting the strike. Attitude of London dockers, the telegram

said, appears to be based on misinformation and Communist propaganda. Sir Robert Gould, the Labor Ministry's top negotiator, met with executive committees of the Lightermen's Union and the Stevedores' and Dockers' Union.

U. S. State Department announced that the U. S. and the U. K. have decided to let export price of German steel scrap fall to world market prices. Price of German scrap had been fixed last October with the result that prices have kept the scrap from being sold for export.

ECA announced approval of a technical assistance project to help Great Britain make a preliminary survey for construction of a railway link between Rhodesia and East Africa.

Mechanization Study Approved

FOUR-MONTH study of farm mechanization in the United States by two French agricultural experts has been approved by ECA as the first technical assistance project for France. The two men will study the effect of farm mechanization on agricultural production, types of machines used in the United States and the economic implications of mechanization.

Air France traffic between New York and Paris nearly doubled in the first four months of 1949 as compared with the same period last year.

Interesting sidelight on travel in France is a report by the president of the French Touring Club who discloses that water-closets in French provinces are responsible for an enormous loss of foreign tourist revenue. Tourists attracted to places of historical and traditional interest are horrified, it seems, by the hygienic arrangements in the charming provincial villages.

Revise Plans for Steelworks

REVISED plans for construction of the new electro-steel works now building at Mo i Rana in northern Norway have been approved by the Norwegian Parliament. According to revised proposals, cost of completing first of the project's three building stages was set at \$57.6 million. Members moved to accept a revised construction program forwarded by the board of the new steel works last summer when choice of a new power source upset earlier building and production plans.

Netherlands Ship Tonnage Up

IN THE first quarter of 1949, 83 vessels (100 tons or over) of 187,062 tons, were commenced, launched and completed in the Netherlands. At the end of the first quarter 106 ships

of 286,623 tons were under construction. These figures were higher than in the fourth quarter of 1948 when 85 ships totaling 129,318 gross registered tons were completed and 108 of 228,519 tons were under construction at the end of the quarter.

The first use of Marshall Plan counterpart funds in the Netherlands has been announced in Washington with the release of about \$91 million for housing construction, agricultural development and reclamation of land in the Zuider Zee.

Germany

PRODUCTION of passenger cars in the Bizone reached 6301 in April, compared with 6126 in March and 5284 in February. Truck output was 3974 in April, 4663 in March and 3793 in February.

Approximately 60 per cent of the locomotives in the Soviet zone of Germany are in need of repair. Wheels are the major item in need of repair, and they are not available, according to the German Economic Commission in the Soviet zone.

New Mission Chief Appointed

NEW chief of the special mission to the United Kingdom is W. John Kennedy, formerly under secretary of the Navy. He succeeds Thomas K. Finletter. Mr. Kennedy was connected with the Navy Department from 1941 to May of this year. He served as assistant general counsel, general counsel, chairman of the Price Adjustment Board and vice chief of the Office of Procurement and Material.

ECA Authorizations to July 1

CUMULATIVE total for nonferrous metals and products of procurement authorizations granted all European countries under the Marshall Plan from the beginning of the ECA program, Apr. 3, 1948 to July 1, 1949 is \$359.1 million. Breakdown:

Copper	\$167,600,000
Aluminum	\$63,700,000
Zinc	\$55,800,000
Lead	\$50,700,000
Brass and Bronze.....	\$7,200,000
Nickel	\$6,400,000
Tin	\$1,800,000
Other (incl. precious metals)....	\$5,700,000

Cumulative total for iron and steel mill materials and products, including ferroalloys, is \$174.1 million.

Named Science Attache

LEO J. LASSALLE, dean of engineering at Louisiana State University, has been appointed a scientific attache at the United States Embassy in London. As a member of the science staff in that office, he will report to the State Department on progress in engineering technology in the United Kingdom.

Study American Forge Practice

THE visiting British drop forge team that has been studying "know-how" at United States and Canadian plants, was most struck with the mechanical aids in American forge shops that enable workmen to concentrate on production.

That is the major lesson the team takes back to the United Kingdom, according to its leader, Hugh

A. Wallace, assistant to managing director, B. & S. Massey Ltd., Manchester.

Suggestions—Here are some of practices likely to be adopted in Britain as result of the trip:

Use of hydraulic machines to scale billets, prior to forging, with water at high pressure.

Easing of the hammerman's work by reduction of the risk of bad forging and greater production per heat, as result of die design based on extensive research.

Use of novel lubricants to lengthen life of dies.

Shearing of forging bars and billets with resulting great savings in labor and materials.

Stelliting the edges of clippings, tools, and cutting these tools into segments to increase their adjustability to increase the life and usefulness of such tools.

Economy in the use of steam; it was found that at one plant exhaust steam from the hammers passed through a low-pressure turbine.

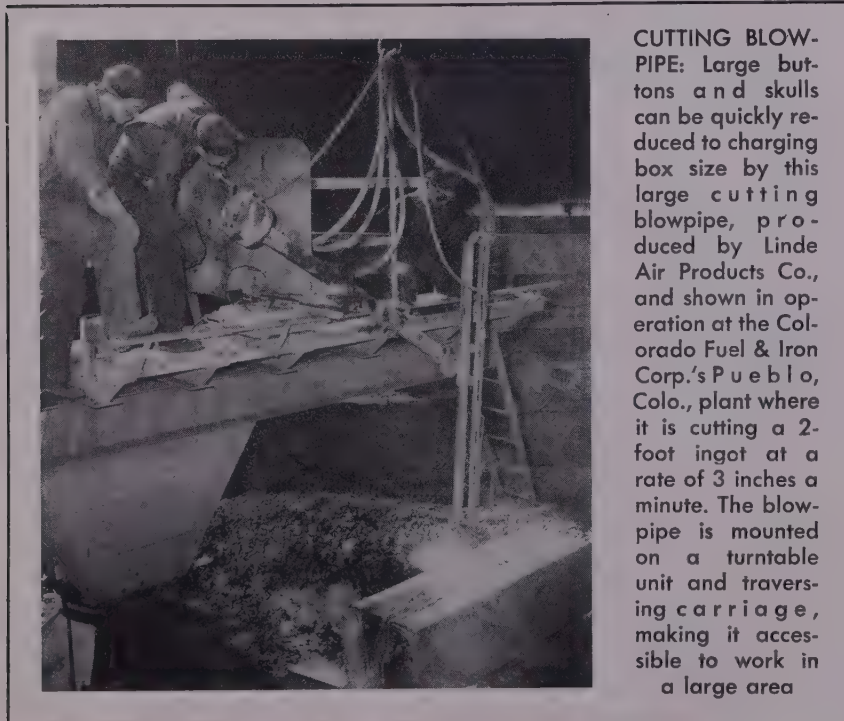
Universal use of such safety devices as goggles, gloves, crash helmets, safety boots, etc., and of thoroughgoing regulations to protect workers' safety.

Valuable Leads—The British visitors believe they gave many valuable leads to their hosts. In one case it was suggested Cerro alloy, a low melting-point, non-shrinking, proprietary material be used to get accurate test impressions of dies before putting them into production. An improved method of stretching forgings was suggested. Flash welding of short left-over bar sections was flash-welded together in England to obtain sufficient length of material for further upsetting operations.

At one shop where exhaust steam was discharged into the plant it was suggested that discharge, instead, through a vertical venturi turbine. Another recommendation was graphite lubrication of dies. Another was for the use of warming pans and gas rings for preheating cold dies instead of putting them to work on hot steel without such preparation. The visitors said that instead of using hardwood pegs to operate the lifting bar on board hammers, they would longer life by using tubes made of special material known as "tufnuc."

Denmark

DANISH shipyards in May were constructing 31 vessels, totaling 120,000 gross registered tons, of which 10 were being built for Denmark, 5 for France, 4 for Norway, and 2 for Iceland.



CUTTING BLOW-PIPE: Large but-tons and skulls can be quickly reduced to charging box size by this large cutting blowpipe, produced by Linde Air Products Co., and shown in operation at the Colorado Fuel & Iron Corp.'s Pueblo, Colo., plant where it is cutting a 2-foot ingot at a rate of 3 inches a minute. The blowpipe is mounted on a turntable unit and traversing carriage, making it accessible to work in a large area

Planning Needed

To demonstrate lasting value of free enterprise, steel man tells concrete reinforcing meeting

FLEXIBLE, realistic, organized and continuous planning by industry should do the kind of business-management job necessary to demonstrate the lasting value of free enterprise, David F. Austin, vice president, U. S. Steel Corp., told members of the Concrete Reinforcing Steel Institute meeting at White Sulphur Springs, W. Va.

Mr. Austin said he was disturbed by an alarming number of people who are unknowingly turning away from the ideals of free enterprise and moving unwittingly in the direction of the welfare state. He said industry must attempt to develop a sounder working relationship with government on the one hand and with labor on the other, fostering a spirit of teamwork in the best interest of the nation.

Second Task—A second major task of industry, Mr. Austin said, is re-establishment of the rule of reason in the climate in which business operates.

"We must demonstrate that size in business, far from being a blight upon the economic structure, will continue, as in the past, to endow this country with the benefits of greater productivity, lower prices, and wider distribution," he said.

In the area of government regulation and taxation, Mr. Austin declared, industry must be permitted to compete for a share of any consumer's business, anytime, anywhere, and it must see to it that taxation remains a source of revenue used to provide required government services, not a punitive measure used to discourage enterprise or to destroy initiative.

Wide Distribution—"To utilize our present industrial facilities properly and to clear the way for further bound expansion," the steel man said, "we must continue to strive for wider and wider distribution of all products. To accomplish this objective, we must have more effective selling. Planning for the future in the midst of the complex problems of today means that we in industry must staff and organize our companies to handle more than just immediate problems of production and sales.

"The first and cardinal principle of sound organization planning is the recognition and anticipation of change—and we must cultivate the ability to adjust ourselves to meet this challenge. The second principle of organization planning is realism—the kind of realism which only broad

business experience provides. The need for realism is illustrated all too clearly in some of the criticism which has recently been leveled at the steel industry regarding capacity."

Pipe Line Petitions to FPC

UNITED Gas Pipe Line Co., Shreveport, La., has asked the Federal Power Commission to authorize construction of a 26-mile pipeline project to connect four gas fields in southwestern Louisiana with the company's system in eastern Texas. Line would have a capacity of 112 million cu ft of natural gas per day. Cost of project is estimated at \$1,792,000. Lake Shore Pipe Line Co., Cleveland, has asked the FPC to authorize building of 45 miles of pipe line in western Pennsylvania and northern Ohio to transport gas for distribution in Ashtabula and Lake counties. Estimated cost of the construction is \$1,024,540.

Carrier Expands, Buys L.A. Firm

WESTERN expansion plans have been announced by Carrier Corp., Syracuse, N. Y., manufacturer of air conditioning and refrigeration equipment.

According to Claud Wampler, president, Carrier is purchasing control of C. E. Howard Corp., Los Angeles, maker of stainless steel vessels and citrus juice concentrators. George N. Lilygren, vice president of Carrier, will become president of Howard Corp., and Harry W. Smith will be general manager.

Distribution Economies Needed

INDUSTRY is overlooking a price-cutting opportunity in failing to pare distribution costs, says James F. Lincoln, president of Lincoln Electric Co., Cleveland.

Speaking before the fourth annual Estes Park Industrial Conference, Mr. Lincoln declared that in many instances a product costs more to sell than to produce. Lincoln Electric is approaching the problem by experiments with sales of welders used on farms.

GE Completes Lynn Facilities

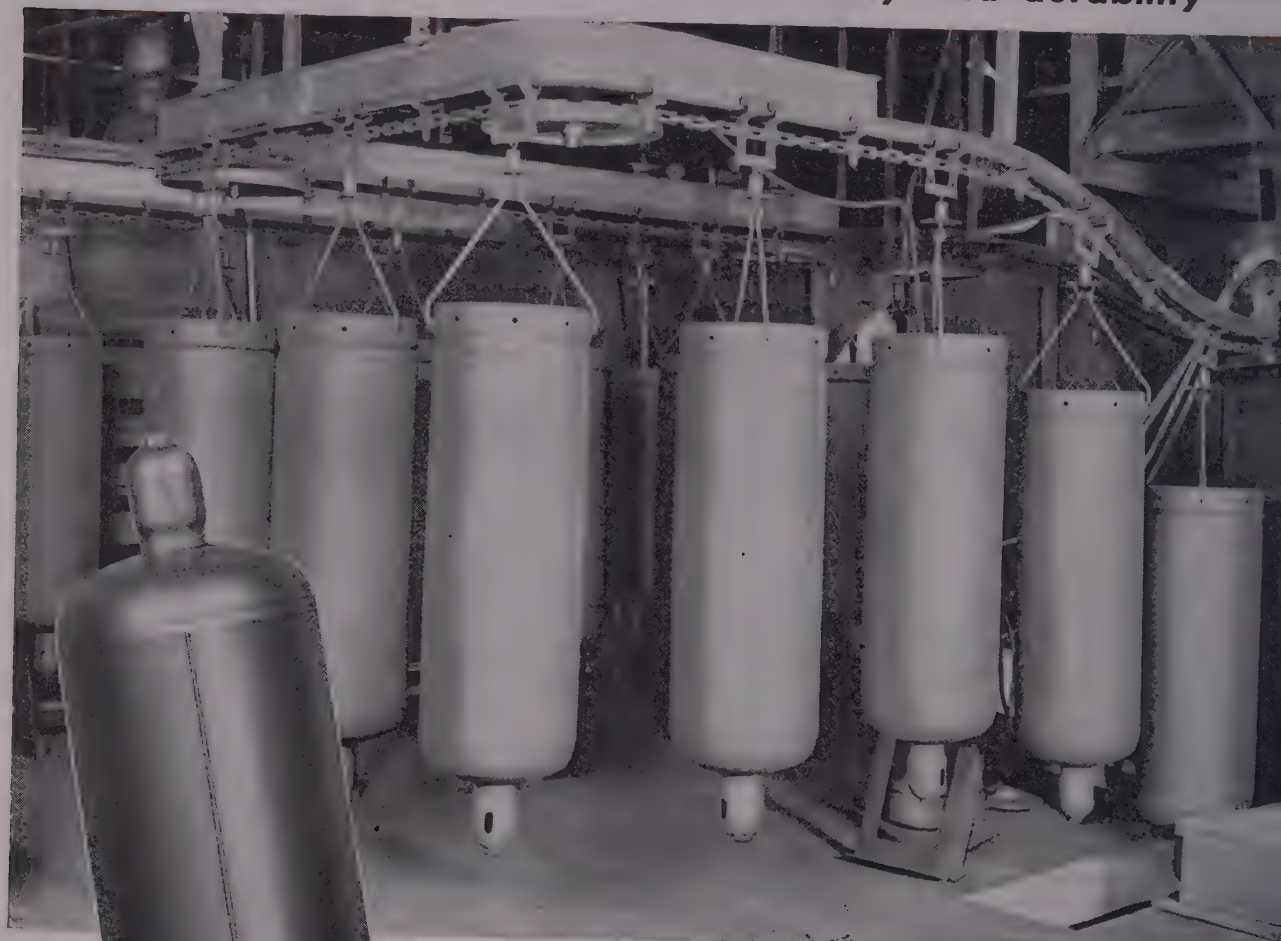
COMPLETION of a \$3,205,000 program for the modernization of General Electric Co.'s facilities at Lynn, Mass., has been announced. Since the war 100,000 sq ft of floor space has been added to the GE division. The plant produces traffic signals and controls, street, flood and airport lighting fixtures and metallic rectifiers.

CALENDAR OF MEETINGS

- July 28-29, American Foundrymen's Society: Annual directors' meeting, Chicago.
- Aug. 10-12, Western Packaging Exposition: Civic Auditorium, San Francisco.
- Aug. 15-17, Society of Automotive Engineers: National West Coast meeting, Portland, Ore.
- Aug. 23-26, American Institute of Electrical Engineers: Pacific general meeting, Fairmount Hotel, San Francisco. Headquarters are at 33 W. 39th St., New York 18.
- Sept. 9-12, Instrument Society of America: Clinic on maintenance of industrial instruments, Hotel Statler, St. Louis. Society headquarters are at 921 Ridge Ave., Pittsburgh.
- Sept. 12-16, Instrument Society of America: National conference and exhibit, Municipal Auditorium, St. Louis. Society headquarters are at 921 Ridge Ave., Pittsburgh.
- Sept. 14-16, Porcelain Enamel Institute: 11th annual forum, Ohio State University, Columbus, O. Institute headquarters are at 1010 Vermont Ave., N. W., Washington.
- Sept. 15-16, Magnesium Association: Quarterly meeting, Hotel Statler, Detroit. Association headquarters are at 30 Rockefeller Plaza, New York.
- Sept. 21-24, National Association of Foremen: 26th convention, Hotel Statler and Masonic Temple, Detroit. Association headquarters are at 321 W. First St., Dayton, O.
- Sept. 25-Oct. 1, American Institute of Mining & Metallurgical Engineers: Midyear meeting, Neil House, Columbus, O. Details may be obtained from J. H. Melvin, Orton Hall, Ohio State University, Columbus, O.
- Sept. 26-28, National Electronics Conference: 1949 conference and exhibit sponsored by Illinois Institute of Technology, Edgewater Beach Hotel, Chicago. Nathan Cohn, Room 1505, 307 N. Michigan Ave., Chicago, heads the exhibits committee.
- Sept. 29, American Iron & Steel Institute: Regional technical meeting, Hotel Statler, Buffalo.
- Oct. 3-4, National Association of Corrosion Engineers: South central regional meeting, Adolphus Hotel, Dallas. Heading the arrangements committee is G. R. Olson, United Gas Pipe Line Co., Shreveport, La.
- Oct. 3-5, American Coke & Coal Chemicals Institute: Annual meeting, Skytop Lodge, Skytop, Pa. Institute headquarters are at 729 15th St., Washington.
- Oct. 3-6, Association of Iron & Steel Engineers: Annual convention, William Penn Hotel, Pittsburgh. Association headquarters are at 1010 Empire Bldg., Pittsburgh.
- Oct. 4-6, Society of Industrial Packaging & Materials Handling Engineers: Fourth annual exposition, Detroit.
- Oct. 6, American Iron & Steel Institute: Regional technical meeting, Drake Hotel, Chicago.
- Oct. 10-14, American Society for Testing Materials: First Pacific area national meeting, Fairmount Hotel, San Francisco. National headquarters are at 1916 Race St., Philadelphia.
- Oct. 12-15, Electrochemical Society: 96th convention, La Salle Hotel, Chicago. Details may be obtained from H. B. Linford, secretary of the society.
- Oct. 16-18, Conveyor Equipment Manufacturers Association: Annual meeting; write to G. D. O'Brien, assistant manager, Greenbrier Hotel, White Sulphur Springs, W. Va.
- Oct. 17-21, 31st Annual National Metal Congress and Exposition: Sponsoring societies are: American Society for Metals, American Welding Society, Metals Branch of the American Institute of Mining and Metallurgical Engineers and Society for Non-Destructive Testing. Public Auditorium, Cleveland. Secretary of American Society for Metals is W. H. Eisenman whose headquarters are at 7301 Euclid Ave., Cleveland 3.
- Oct. 23-26, National Institute of Governmental Purchasing: Meeting, Hotel Cleveland, Cleveland.

N-A-X HIGH-TENSILE STEEL in L.P.G. Cylinders

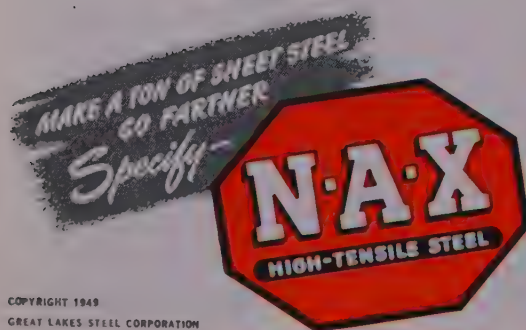
means light weight with added safety and durability



Photographs of the Lee cylinder, courtesy of the Steel Cooperage Company, Detroit.

Because of the greater strength and excellent fabricating, welding and copper brazing properties of this low-alloy, abrasion- and corrosion-resisting steel, cylinders made with it (to conform to I.C.C. safety requirements) are 35% lighter in weight than when made with conventional carbon steel.

This weight reduction (with longer life) means greatly reduced shipping and handling costs . . . and over-all savings to consumers.



GREAT LAKES STEEL CORPORATION

N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
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Mirrors of Motordom

Development of modern automotive ignition system and electric self starter commemorated by Dayton "barn-loft gang" and General Motors executives

DETROIT

FORTY years ago in a barn loft on Central avenue in Dayton, O., three engineers of the National Cash Register Co. decided their experiments with a relay-controlled automotive ignition system were promising enough to warrant incorporation of a new company. They were Col. E. A. Deeds, now NCR board chairman, William A. Chryst and Charles F. Kettering, and the corporate baby was Dayton Engineering Laboratories Co., soon to be known as Delco and eventually to spread out into four manufacturing divisions of General Motors. Last week the "barn-loft gang", in company with lesser-known survivors of the original crew which worked in Col. Deeds' barn, were joined by a number of top GM executives to commemorate the birth of the modern automotive ignition system and the electric self starter.

At its start, Delco was financed by mortgages on Colonel Deeds' property, money borrowed on Kettering's modest life insurance and \$1500 Mrs. Kettering had saved as a music teacher. Her money, incidentally, was used to buy a milling machine. It signaled the start of a brilliant career for the most renowned scientist, inventor and philosopher the automotive industry has known.

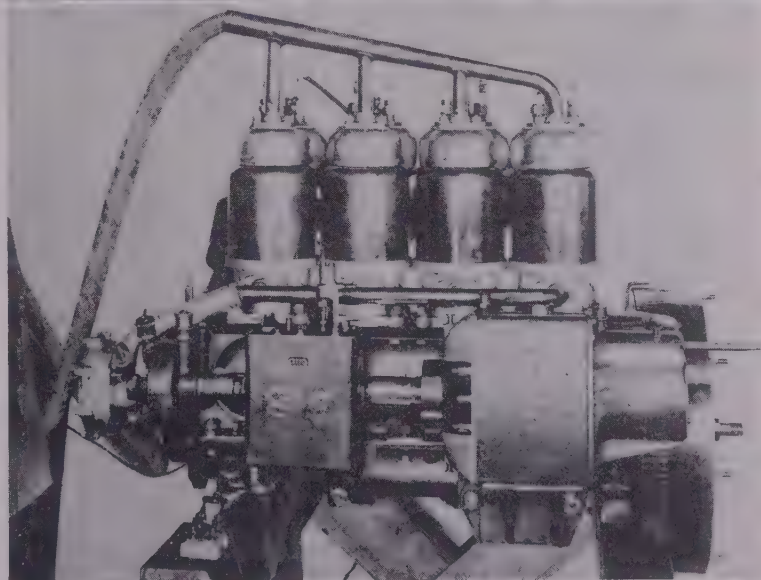
Introduced in 1910—Cadillac introduced the ignition system, on its 1910 model at the Atlanta, Ga., auto show, Nov. 9, 1909, and because Cadillac President Henry Leland and his engineers were not positive it would work, they left the old magneto and dry cell battery installation on the car. But Leland had strong faith in Kettering and spurred him on in the development of a complete electrical package to include ignition, self starter, generator and lighting system. By September, 1910, Kettering and Bob DeMaree, an assistant draftsman, had their blueprints for the starter ready and the first sample was completed for a test three months later.

Early the following year a new Cadillac was wheeled into the Deeds barn to be fitted with the starter, only to be met with the discovery there was no room under the hood

for it. So the barn-loft gang had to redesign the starter unit twice before they could get it to fit. It was Feb. 16 before the first starter was expressed to Detroit for Cadillac. Leland accepted it, rushed back an order for 12,000 units to cost \$2 million, and Delco was really in business.

Encounter Supplier Trouble—Meanwhile Kettering fractured a leg in a test car accident and while re-

cuperating was informed the car had been ruined in a garage fire. Undaunted, Kettering dragged himself to Detroit, plaster cast and all, to repair the damaged starter. Then, with plans for production set, the company ran into supplier trouble. Doubt over the workability of the starter was heightened by the advice of electrical "experts" who predicted the device would electrocute motorists, attract lightning, etc. So Kettering and Deeds scrambled to line up more capital to organize their own manufacturing company, something in which Kettering did not enthruse too greatly, because he was



Adoption of Charles F. Kettering's relay-controlled ignition system and electric self starter by Cadillac nearly 40 years ago was a historic turning point in the automotive industry. Top photo, taken June 9, 1914, shows, left to right: J. B. Edwards of Kellogg Switchboard & Supply Co., which made the coils for the ignition system; William A. Chryst, engineer who worked with Kettering on the two developments; Henry Leland, the president of Cadillac at the time; and "Boss Ket." Lower photo shows the electric self starter as it first appeared attached to the 1912 Cadillac engine. The starter also functioned as a generator and meshed with the engine flywheel

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first of all an inventor and once one of his ideas reached the production stage he preferred to turn them over to someone else. Finally, however, Delco operations were under way in a plant purchased from a power company, only to be met by a spring flood which inundated basement and first-floor shops. As if this were not enough, there then came patent infringement suits which the company had to fight through the courts with limited funds. However, the self-starter was here to stay, and Delco expanded steadily as the nucleus of various units which later became GM divisions. They include Delco Products, Delco-Remy, Delco Radio and Delco Appliance, with plants at Anderson, Bunker Hill, Kokomo and Muncie, Ind., Dayton, Chicago, New Brunswick, N. J., and Rochester, N. Y.

Headed GM Research—Kettering left Delco in 1920 to organize GM Research Corp., forerunner of the GM Research Laboratories Division, from which he retired only a short time ago. However, he is still around the premises frequently and has numerous other interests in Detroit, New York and Dayton which keep him on the move. He is probably the wealthiest individual in the industry, reportedly never having sold a share of his General Motors stock, of which he owns better than 400,000 shares.

Olds Engine Plant Expanded

EXPANSION of the Oldsmobile \$10 million V-8 engine plant in Lansing, Mich., has been going ahead quietly since last winter when decision was made to double output. Described in STEEL, Sept. 27, 1948, the installation had original capacity of 30 engines an hour and was fully integrated from the standpoint of equipment and materials handling. Doubling output required all new layouts, rearrangement of machinery, conveyor lines and assembly stations which were effected without the loss of a single engine originally scheduled for production. By Aug. 1 the new schedules will be realized. In some cases it was necessary to move machinery into aisles temporarily, and other rearrangements were carried out on Sundays, holidays and at odd hours in order not to interfere with the five-day, two-shift operations.

About 80,000 sq ft has been added to the plant, bringing total area to some 246,000 sq ft. The plant conveyor system has been extended to approximately 4 miles in length, the final assembly line to 476 feet. A re-

designed chip conveyor system is now able to remove 4½ tons of cast iron chips per hour.

Concurrently Olds is converting two existing warehouse buildings into a new final car assembly plant with capacity of 80 per hour. Area covers more than half a million square feet of working space and will be supplemented by a large marshalling area to facilitate drive-aways, a new car conditioning plant to provide expanded retail customer delivery service and new materials receiving docks which can handle an average of 150 trucks daily.

Oldsmobile built 139,309 units in the first six months of the year and

ly wage rate climbing from 71 cent to \$1.65. These and other pertinent figures were cited by president George T. Christopher, addressing a "class" of 187 veteran employees who last week reached the 25-year point in service with the company.

Packard has an investment in equipment and working capital of \$5982 for each employee now on the payroll, has spent in the past 2½ years a total of \$53 million for new buildings, machinery and other facilities, \$28 million for development and engineering of the product and over \$73 million for new tools. Sales during the period totaled nearly \$3184 million, with profits \$142 million, or 4.47 per cent on sales.

U.S. Makes 80% of World's Cars

DESPITE livelier foreign competition, the U. S. produced and sold more than 80 per cent of all motor vehicles made in the world last year, including 85 per cent of the passenger cars. At the same time, imports of foreign-made cars into this country surpassed all countries of the world, except Australia and the Union of South Africa, reflecting the British drive for dollar balance through heavy exports. In this respect Great Britain passed the U. S. for first time by exporting 226,912 units, or 68 per cent of its total passenger car production. U. S. plants built 3,909,270 passenger cars and exported only 6 per cent of them.

The data are from the forthcoming edition of the Automobile Manufacturers Association booklet, *Facts and Figures*, the twenty-ninth to mark its appearance. Statistics show Canada in No. 3 position with respect to passenger car output, France fourth and Italy fifth. No figures are available for Russia. Last year the U. S. had one motor vehicle for every 3.5 persons, Poland one for every 347 and Yugoslavia one for every 4425.

During the year American motorists paid an all-time high of nearly \$3 billion in special motor vehicle taxes up 12 per cent from 1947. Nearly one-third of the total was derived from truck operators, although trucks comprise less than 18 per cent of total vehicles registered.

Dodge Builds Station Wagon

FIRST Dodge station wagon to be built since 1938 is now on the market, carrying steel roof and steel door panels, with trim and roof pillars of ash construction. The body seats nine and has spare tire mounted in a metal cover on the outside of the tailgate.

Automobile Production

Passenger Cars and Trucks—
U. S. and Canada

	1949	1948
January	445,092	422,236
February	443,734	399,471
March	543,711	519,154
April	569,728	462,323
May	508,101	359,996
June	628,000*	454,401
Six mos.	3,138,366*	2,617,581
July		489,736
August		478,186
September		437,181
October		516,814
November		495,488
December		514,837
12 mos.		5,549,323

*Preliminary.

Estimate for week ended:

	1949	(Same week) 1948
July 2	144,822	112,307
July 9	118,611	98,700
July 16	155,350	120,741
July 23	157,000	118,797

Estimates by
Ward's Automotive Reports

sales for the same period were better than 130,000. August schedules are being pushed up another notch to around 31,000.

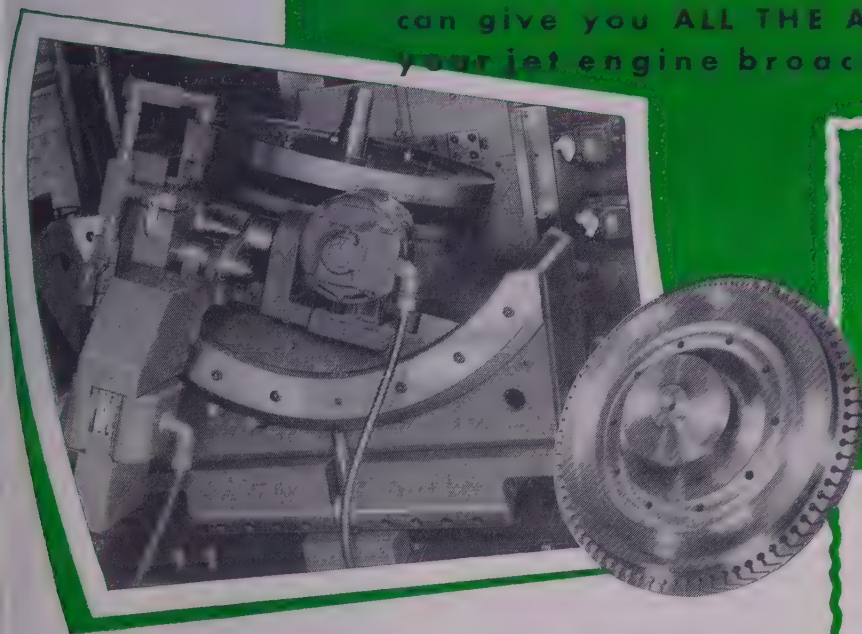
Looking Back 25 Years

PRICES of new Packards have dropped 53 per cent in the past 25 years, while most basic materials used in their manufacture have risen from 53 to 311 per cent. Steel is up 53, copper 78, brass 93, coal 109, iron 127, lead 133, zinc 169 and coke 311 per cent. Only decreases in the quarter century have been rubber, down 27 and aluminum 46 per cent. In 1924 employees had to work 6577 hours to pay for a new car, compared with 1363 today, average hour-

LAPOINTE

UNIVERSAL FIXTURES

can give you ALL THE ANGLES to solve your jet engine broaching problems!



Instinctively, the aircraft industry for many years has looked to Lapointe for the most advanced engineering ideas on broaching. This is natural, for Lapointe not only pioneered broaching as an economical machining method but has always led the way in driving down broaching costs.

Take these universal fixtures, for example. Designed for holding the large compressor rotors at compound angles, they have greatly simplified the entire broaching procedure. Using the sine bar principle, the new Lapointe fixture replaces 12 fixed angle blocks formerly required — thus saving much valuable time when changing from one rotor to another.

Lapointe universal broaching fixtures make it easy for you to develop your ideas as you go along. In jet engine design, where improved efficiency is the constant aim, these universal fixtures are a major asset in helping you to achieve the maximum thrust and the ultimate in power . . . visible indications of an efficient engine.

It pleases us that so many of America's large and small production plants are saying: "Lapointe's the way to better broaching!" Write for our special folder describing the Lapointe Single Ram Vertical Broaching Machine. Ask for Bulletin SRV-3.

THE Lapointe

MACHINE TOOL COMPANY

HUDSON, MASSACHUSETTS • U. S. A.
Branch Factory • Edgware • Middlesex • England



THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHES AND BROACHING MACHINES

Adds TV after Expansion

Noblitt-Sparks add five video models to diversified line. Expects to increase sales

NOBLITT-SPARKS Industries Inc., Columbus, Ind., manufacturer of steel furniture, automotive appliances and tubular steel products, has completed its \$2.5 million postwar plant expansion program.

The company has added television sets to its diversified line of products. Television line includes five models, retailing from \$249.50 to \$399.50. Production has begun on two of three 10-inch tube models, and the company expects to have one 12-inch tube and one 16-inch tube model in production at the end of five weeks.

Video line is expected to increase the firm's sales over the next few months; thus far in 1949 sales have been 11.5 per cent below the like period in 1948.

Small appliances and radio sales have been running considerably below a year ago, but steel furniture sales have been up sharply.

Autoparts and accessories business is holding up well.

Fourth Installation in Memphis

CONTRACT for a fourth installation in Memphis, Tenn., has been let by International Harvester Co, Chicago. A wholesale parts department will be built at a cost of about \$1 million in South Memphis. Occupancy is expected next spring. Employing 200 persons when in operation, the depot will serve as a distribution center for parts for all Harvester products and will serve dealers and district operations in Arkansas, Louisiana, Mississippi, western Tennessee, southeastern Missouri, southwestern Kentucky and a portion of eastern Texas.

Memphis depot is the fifth in a network of 11 to be installed at key points in the U. S. The one-story building will include about 138,000 sq ft of floor space and will be served on two sides by a spur track of the Illinois Central Railroad industrial loop. A mechanical conveyor system will facilitate handling of service parts.

SKF Expands Shippensburg Plant

EXPANSION of its plant at Shippensburg, Pa., has been announced by SKF Industries Inc., Philadelphia. Additional facilities will be provided for production of antifriction bearing retainers and will enable the ball and roller bearing firm to take over



Part of maintenance machine shop at A. E. Staley Mfg. Co.

a substantial portion of work now subcontracted. Work is also under way on two additions to the plant which will provide larger quarters for tool and die and stamping operations.

Staley Builds Maintenance Shop

COMPLETE maintenance shop, including machine, boiler, tin, electrical, millwright, lubrication and paint divisions, is provided in a \$11.6 million modernization program of the A. E. Staley Mfg. Co., Decatur, Ill., corn and soybean processors.

Much of the machinery used by Staley is subject to highly corrosive influences and maintenance takes on an added importance.

Quick access to tools and material in the centralized maintenance shop is provided by the layout of the various divisions around a central core of storerooms.

The machine shop, part of which is shown in the accompanying illustration, includes 27 new machines, enabling work to be done in the plant which formerly had to be sent to outside shops. Included are a 48-inch lathe, a 42-inch open side planer a 10-inch vertical boring mill and other equipment to build new parts and repair old ones.

Westinghouse Awarded Contract

BUTTON PUSHERS on all floors will get an even break in the projected 39-story Mellon-U. S. Steel

skyscraper when high-speed, automatically controlled elevators are stalled. Contract for the building's vertical transportation system was awarded to the Westinghouse Elevator Division of Westinghouse Electric Corp. which will install 28 passenger, service and freight elevators and two electric stairways in the building to be located at 525 William Penn Pl., Pittsburgh.

Company Gets 2 Tube Mills

FORMED TUBES Inc., Sturgis, Mich., manufacturer of tubular steel products, has announced installation of two Yoder electric weld tube mills. One mill is in operation, and the other is being set up.

President Harry C. Montague stated the installations will practically complete the major expansion of his firm in 1949. Several new fabricating machines had already been added to step up production.

With both mills in operation the company expects to produce 48,000 feet of tubing daily.

Fairbanks, Morse Chicago Branch

NEW BUILDING to house Chicago branch of Fairbanks, Morse & Co., scale manufacturer, has been announced. Structure and site represent an investment of more than \$500,000. Sales and service personnel, warehousing and repair facilities for the company's operations in the Chicago area will be housed in the building.

Briefs

Paragraphs on developments of interest and significance within the metalworking industry

Moore & White Co., Philadelphia, manufacturer of paper-making machinery, has purchased Syco Mfg. Corp., Syracuse, N. Y., maker of paper-machine drives. Trade name and patents of Syco are included in the sale.

Thriftmaster Products Corp., Lancaster, Pa., and Dorman Machine Tool Works, Mt. Vernon, N. Y., have consolidated. Thriftmaster will manufacture the complete line of Dorman tapping attachments and Thriftmaster fixed center and adjustable drill-heads at its Lancaster plant. Walter E. Dorman has been appointed general sales manager of Thriftmaster.

Cory Corp., Chicago, has introduced two new all-metal, automatic coffee brewers in a bid to make automatic brewers a mass market sales item.

Decorative Cabinet Corp., Kearny, N. J., has been approved by the government for purchase of part of the Port Johnson Terminal, Bayonne, N. J. The company which manufactures household storage chests and closets expects to spend \$150,000, in addition to the same purchase figure, for improvements and to consolidate both its present plants at the site.

Federal Products Corp., Providence, R. I., manufacturer of precision measuring instruments, has moved its Los Angeles branch office to 1308 Magnolia Ave.

Michigan Tool Co., Detroit, has appointed Dolan Industrial Sales, Houston, to handle increasing demand for machine tools in the developing southern Texas industrial area.

Ohio State University Department of Ceramic Engineering will investigate gases which cause blisters, bubbles and other defects in fired ceramic ware. Project was established through the Orton Ceramic Foundation.

Whitcomb Locomotive Co., Rochelle, Ill., subsidiary of Baldwin Locomotive Works, is currently filling an order for seventy-five 75-ton locomotives for S.I.A.M. di Tella of Buenos Aires for Argentine State Railways. Currently being produced at the rate of nine per month, locomotives will be used for main line passenger and freight service.

Armco Steel Corp., Middletown, O., reports its East Works and Butler,

Pa., plants have established safety records. East's 4500 employees worked 129 consecutive days without a major accident, with 3,312,000 man-hours of work performed. In Butler 133 straight safe days were worked with 2,630,000 man-hours free from accident that kept a man from his job.

Linde Air Products Co., unit of Union Carbide & Carbon Corp., New York, has opened an oxygen distributing station and acetylene producing plant at Fargo, N. D.

Research Co. of America, New York, has released the 1949 edition of "A Basic Marketing Chart of the United States," a compilation of data designed to facilitate analyses of current business conditions and trends.

Elston-Nichols Corp., Chicago, has named Gehring Sales Co., Chagrin Falls, O., as sales representative for lacquer thinners in Ohio and northern Kentucky.

Amperex Electronic Corp., Brooklyn, N. Y., manufacturer of radio vacuum tubes, has appointed S. Sterling Co., Detroit, as sales representative in Michigan.

Englander Co. Inc., Chicago, manu-

facturer of bed springs and related products, has moved its Brooklyn purchasing offices and Sani-Textile Division to 538 Johnson Ave., Brooklyn, N. Y.

Laclede-Christy Co., St. Louis, has made a long-term sales contract with Davis Fire Brick Co. and affiliated firms, Oak Hill, O., to market Davis' refractory brick products along with its own refractories items.

James F. Lincoln Arc Welding Foundation has announced awards and scholarships totaling \$6750 for the second series of annual programs for engineering undergraduates. They will receive awards ranging from \$25 to \$1000 in 47 different engineering colleges and universities.

Crown Chemical Sales Corp., Indianapolis, has been incorporated and will control sales of products manufactured by Crown Chemical Co. Inc. Harry L. Peterson is president and treasurer of the new company; sales will be directed by Archie Wahlman.

Galveston Division of Todd Shipbuilding Corp. has let contracts for propulsion equipment for two new ferry boats to General Electric. The 1350-hp vessels for the Texas Highway Department will operate between Galveston and Point Bolivar.

Dravo Corp., Pittsburgh, has appointed Clisby Associates Inc., Birmingham, as distributor for Dravo "Counterflo" heaters in central and northern Alabama.

Thermex Division of Girdler Corp., Louisville, has appointed John M. Frey Co., Chicago, and High Frequency Foundry Sales Corp., New York, as agents for Thermex core baking equipment.

Federal Products Corp., Providence, R. I., precision instruments manufacturer, moved its Cleveland branch office to 1511 Warrensville Center Rd., Cleveland 21.

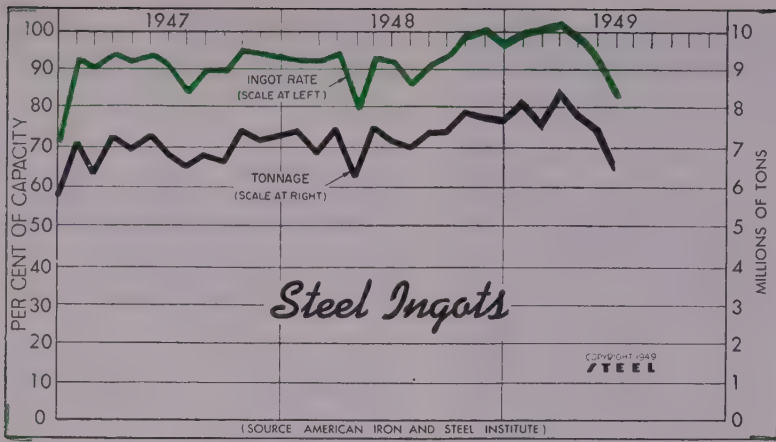
War Assets of General Services Administration has approved sales of the southern portion of the Southwest Emergency Pipeline to Independent Gas Pipe Line Co., Houston, for \$279,000 cash.

Threadwell Tap & Die Co., Greenfield, Mass., has purchased assets, plant and business of Conant & Donelson Co., Conway, Mass. Production has been transferred to Threadwell.

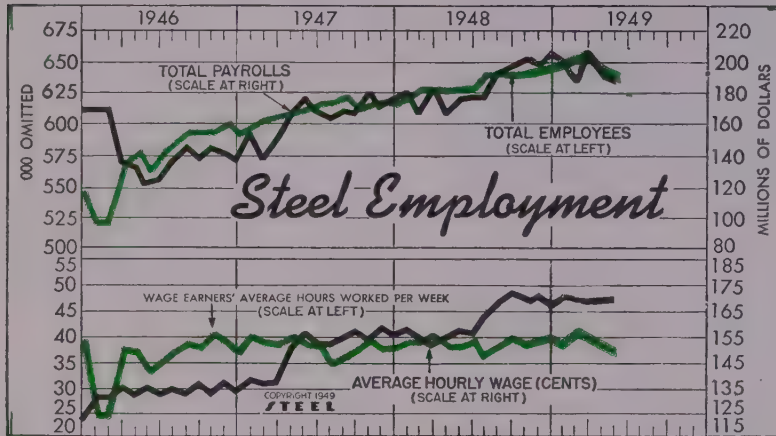
50 Years with Champion

Last Friday night at the Shaker Heights Country Club near Cleveland, Miss Mazy C. Mullarky celebrated her 50th anniversary with the Champion Rivet Co. Miss Mullarky, secretary to T. Pierre Champion, president, has the distinction of being one of the few women in industry witnessing the early growth and development of a well-known company in the metalworking industry.

Champion Rivet was founded in 1895 by Pierre Champion's father, David J. Champion. Miss Mullarky joined the company four years later as secretary and all-around assistant to Mr. Champion who then was busy introducing steel rivets in place of iron rivets. In later years, the company also entered the welding rod and upset forging fields.

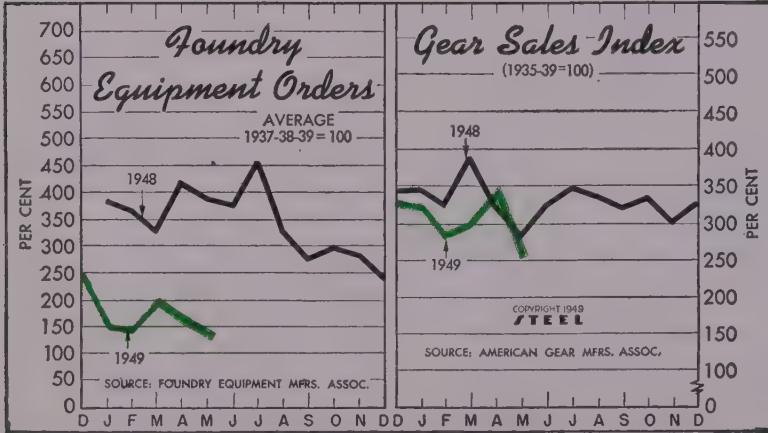


	Production (Net Tons—000)			Operating Rate (% of Capacity)		
	1949	1948	1947	1949	1948	1947
Jan.	8,183	7,473	7,213	100.2	93.6	93.2
Feb.	7,481	6,940	6,422	101.4	93.0	91.1
Mar.	8,388	7,608	7,307	102.7	95.3	94.4
Apr.	7,785	6,218	7,043	98.4	80.4	93.8
May	7,590	7,572	7,329	92.9	94.8	94.7
June	6,501	7,256	6,969	82.2	93.8	92.9
July	...	7,067	6,570	...	88.7	85.1
Aug.	...	7,438	6,982	...	93.1	90.2
Sept.	...	7,416	6,789	...	96.1	90.8
Oct.	...	7,987	7,560	...	100.0	97.7
Nov.	...	7,787	7,233	...	100.7	96.5
Dec.	...	7,771	7,366	...	97.5	95.4
Total	88,534 84,784 Ave.			94.0	93.0	



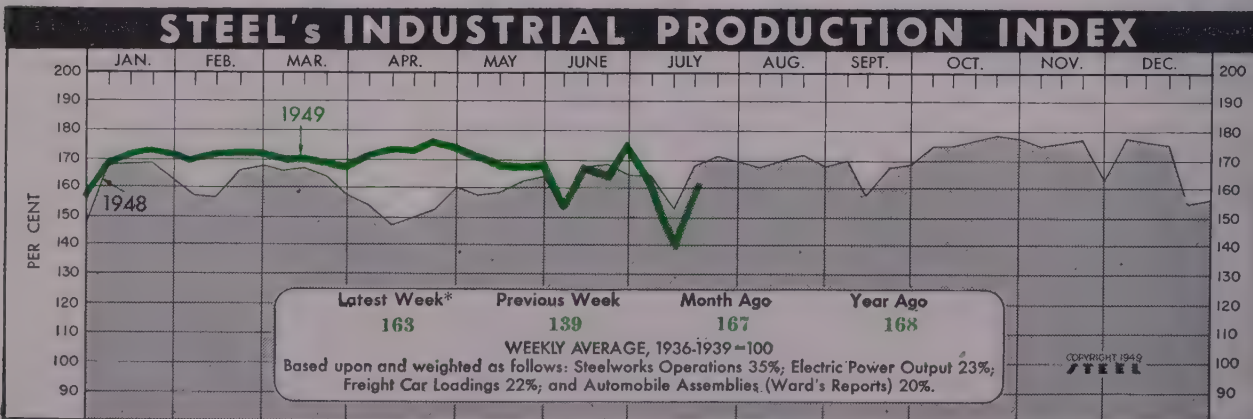
	Employees† (000)		Total Payrolls (millions)		Hourly Wages† (cents)	
	1949	1948	1949	1948	1949	1948
Jan.	650	622	\$202.1	\$180.2	171.3	157.3
Feb.	653	626	189.8	187.6	169.6	155.1
Mar.	652	629	207.2	183.0	168.5	154.8
Apr.	647	626	191.9	168.5	168.8	155.1
May	637	628	188.4	175.3	169.7	157.7
June	...	634	...	179.5	...	156.9
July	...	641	...	179.8	...	164.5
Aug.	...	645	...	193.8	...	168.9
Sept.	...	641	...	199.4	...	171.8
Oct.	...	644	...	201.7	...	169.9
Nov.	...	646	...	199.8	...	172.1
Dec.	...	648	...	205.8	...	169.4

† Monthly average.



	Foundry Equipment Orders*		Gear Sales	
	Index (1937-38-39=100)		Index (1935-39=100)	
	1949	1948	1949	1948
Jan.	149.9	380.9	320.7	346.8
Feb.	144.4	367.3	282.3	324.4
Mar.	190.8	326.2	299.1	389.8
Apr.	172.0	412.0	339.0	320.9
May	121.9	388.5	250.1	283.6
June	...	376.8	...	324.1
July	...	456.3	...	348.4
Aug.	...	324.7	...	335.6
Sept.	...	273.5	...	320.4
Oct.	...	296.0	...	333.3
Nov.	...	284.4	...	309.0
Dec.	...	243.7	...	325.9

* By foundry trades only.



*Week ended July 16 (preliminary).

The Business Trend

REBOUNDED 24 points in the week ended July 16, STEEL's industrial production index climbed to a preliminary 163 per cent of 1936-1939 average. Despite the large increase in the latest week, the index is 5 points lower than for the same week last year.

AUTOMOBILES—Setting the pace for all of industry were the automobile builders who sent 155,350 passenger cars and trucks rolling off the assembly lines during the week ended July 16 for an all-time weekly record. The total for the week represented a gain of almost 37,000 units over the preceding week which included a holiday and broke the former record of 153,647 vehicles set in May of 1929. Obstacles to a continued high assembly rate were removed with the settling of the threatened power strike and postponement of the steel strike. Still hanging fire, however, is the dispute between the United Automobile Workers and Ford.

STEEL—Production of steel for ingots and castings rose to 77 per cent of capacity in the week ended July 16. This was a rise of 17 per cent over the previous week which included a holiday but was down 3 points from the rate for the week preceding the holiday.

COAL—Bituminous coal output totaled 4,880,000 net tons during the week ended July 9, first week of operations under the three-day workweek ordered by John L. Lewis. Production for the corresponding week in 1948 was 9,841,000 tons. From Jan. 1 to July 9 of this year about 260.9 million tons of coal

had been mined compared with 297.7 million tons in the corresponding period last year.

CONSTRUCTION—Dollar volume of contracts for building and engineering works in the 37 states east of the Rocky mountains amounted to \$4,467,676,000 in the first half of 1949, a 6 per cent decline from the total for the corresponding period last year. The contracts awarded, however, aggregated more for the period than for any other year except 1948. Public contracts awarded in the first half of this year were up 17 per cent over the 1948 total while private contracts declined a similar amount.

TRUCKLOADINGS—Motor carriers transported an aggregate of 3,043,781 tons in May as against 3,040,830 tons in April and 3,032,176 tons in May, 1948. According to American Trucking Associations Inc., carriers of iron and steel hauled about 4 per cent of the total tonnage. Their traffic volume decreased 3.6 per cent below April but increased 33.5 per cent over May of last year.

PRICES—Average primary market prices advanced 1 per cent in the week ended July 12 with increases registered in all major groups of commodities except fuel and lighting materials. The wholesale price index of the Bureau of Labor Statistics rose to 154.2 per cent of the 1926 average but was still 8.9 per cent below the comparable week of 1948. The metals and metal products index which had been declining for a number of weeks advanced to 167.6 from 165.6 in the preceding week.

BAROMETERS of BUSINESS		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	77.0	66.0	86.5	90.5
	Electric Power Distributed (million kilowatt hours)	5,342	4,982	5,373	5,197
	Bituminous Coal Production (daily av.—1000 tons)	813	227	2,160	1,640
	Petroleum Production (daily av.—1000 bbl)	4,671	4,668	4,868	5,444
	Construction Volume (ENR—Unit \$1,000,000)	\$190.4	\$138.5	\$150.8	\$126.6
	Automobile and Truck Output (Ward's—number units)	155,350	118,611	146,056	120,741
*Dates on request. †1949 weekly capacity is 1,843,516 net tons. 1948 weekly capacity was 1,802,476 net tons.					
TRADE	Freight Car Loadings (Unit—1000 cars)	640†	595	649	893
	Business Failures (Dun & Bradstreet, number)	167	153	196	91
	Money in Circulation (in millions of dollars)‡	\$27,480	\$27,659	\$27,391	\$27,959
	Department Store Sales (changes from like wk. a yr. ago)‡	—7%	—10%	—5%	—4%
†Preliminary. ‡Federal Reserve Board.					
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	\$13,196	\$12,535	\$12,242	\$14,083
	Federal Gross Debt (billions)	\$252.8	\$252.5	\$251.7	\$252.9
	Bond Volume, NYSE (millions)	\$15.1	\$9.9	\$15.5	\$19.1
	Stocks Sales, NYSE (thousands)	4,561	3,573	4,634	7,211
	Loans and Investments (billions)†	\$62.6	\$62.6	\$61.9	\$62.6
	United States Gov't. Obligations Held (millions)†	\$34,735	\$34,178	\$34,347	\$34,431
†Member banks, Federal Reserve System.					
PRICES	STEEL's Composite Finished Steel Price Average	\$91.82	\$91.82	\$91.82	\$80.27
	STEEL's Nonferrous Metal Composite‡	174.1	168.0	166.0	201.3
	All Commodities†	154.2	152.7	154.6	169.2
	Metals and Metal Products†	167.6	165.6	166.2	159.4
†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100.					

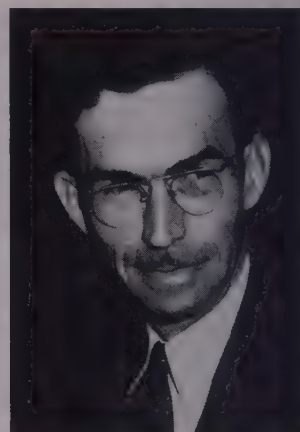
Men of Industry



HARRY A. COOPER



T. W. SIMMONS JR.



KENNETH G. LUNDIE

Harry A. Cooper was elected president, Alloy Casting Institute, New York, at its annual meeting in Colorado Springs, Colo. Mr. Cooper is president, Cooper Alloy Foundry Co., Hillside, N. J. Other officers elected were: **R. W. deWeese**, Electric Steel Foundry Co., vice president; and **E. A. Schoefer**, Alloy Casting Institute, executive secretary and treasurer.

—o—

Avard W. Taylor has been appointed district manager of the Philadelphia and Reading, Pa., territories for Carpenter Steel Co. He formerly was assistant manager. He will have headquarters at Philadelphia.

—o—

Herbert J. Rowe has been named sales engineer for the Great Lakes region by Edward Valves Inc., East Chicago, Ind. He will make his headquarters at the home office.

—o—

Donald E. Whitehead has been appointed lubrication engineer, Crucible Steel Co. of America, with headquarters at Pittsburgh. He formerly was employed by Carnegie-Illinois Steel Corp. in the same capacity.

—o—

Theodore B. Focke, general manager, Airplane Division, Columbus, O., of Curtiss-Wright Corp., has been named vice president and general manager, as well as a director of Wright Aeronautical Corp., Wood-Ridge, N. J., the Engine-Building Division of the corporation. **H. Fletcher Brown**, factory manager of the Airplane Division, has been appointed general manager to succeed Mr. Focke.

—o—

John D. Ingram has been appointed

sales engineer, Horsburgh & Scott Co., Cleveland. He was associated with the company from 1925 to 1941, and rejoins the company to cover Cleveland and the northern Ohio district.

—o—

T. W. Simmons Jr. has been elected vice president and general manager, Johnston Pump Co. of Los Angeles, and **Kenneth G. Lundie** has been appointed general sales manager. Until recently, Mr. Simmons was president of Johnston Aquamatic Co. of York, Pa. He has been identified for many years with the petroleum industry in California. Mr. Lundie has been connected with sales in the turbine pump business for over 25 years. He formerly was western sales manager of Pomona Pump Co., Pomona, Calif., and was in charge of sales for C. J. Hammer Co., Visalia, Calif.

—o—

Nichols Wire & Aluminum Co., Davenport, Iowa, announces that **Frank P. Leahey's** position has been changed from vice president to executive vice president. He has been with the company since 1946, and managed its operations at Battle Creek, Mich., before becoming vice president in 1947, making his headquarters at Davenport. Mr. Leahey was connected for many years with American Steel & Wire Co., both in Worcester, Mass., and Cleveland, and during the war was associated with Spencer Wire Co. in West Brookfield, Mass.

—o—

I. Smith Homans, manager at Newark, N. J., for International Business Machines Corp., New York, has been appointed to the new post of assistant to the president at the

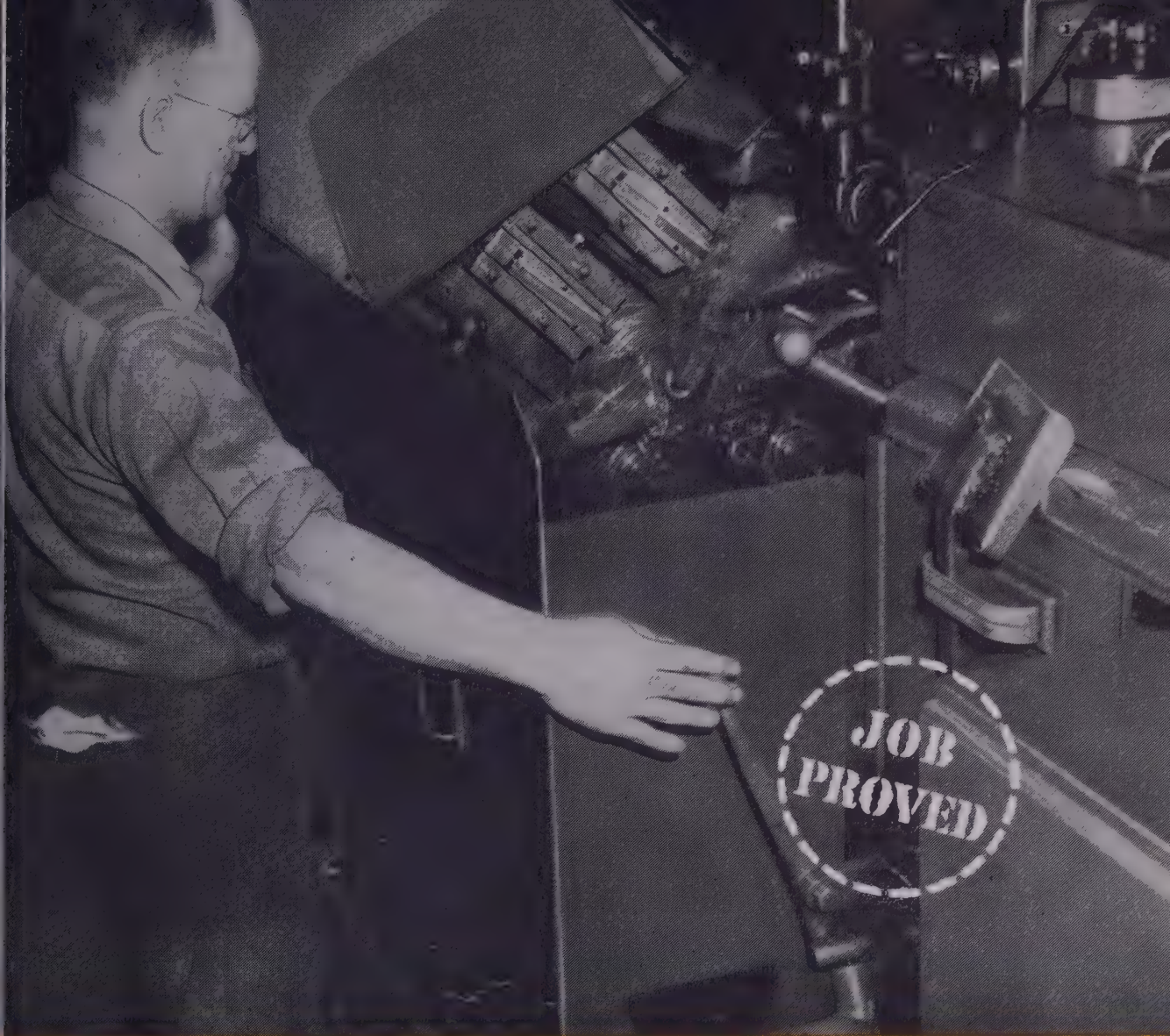
World Headquarters, New York, and **Benjamin H. Askew**, assistant to the IBM controller at World Headquarters, has been assigned to the new post of IBM controller at Endicott, N. Y.

—o—

Glenn L. Martin, for the past 4 years head of his own company, Glenn L. Martin Co., Baltimore, has been elected chairman of the board. **C. C. Pearson** succeeds Mr. Martin as president and general manager. **Harry T. Rowland** has resigned as executive vice president and director. **Morgan R. Schermerhorn Jr.** is vice president, comptroller and director. Mr. Pearson was elected director of the company. **Daniel A. Evatt**, treasurer, was named vice president; **W. L. Lucas** was advanced from assistant treasurer to treasurer; **Earl R. Ulig** from assistant comptroller to comptroller; **Fredrick M. Beall** becomes assistant comptroller; and **Robert A. Schmidt** assistant secretary.

—o—

Eugene R. Gardner and **S. F. Beatty Jr.** have been elected sales manager of Warner & Swasey Co., Cleveland, in the Textile Machinery and Gradall Divisions, respectively. Mr. Gardner joined the company as a special apprentice, was assigned to the Chicago office, later transferring to the New York district office, where in 1917 he became sales manager and eastern sales manager in 1940. He returned to Cleveland as chairman of the company's product planning committee in 1943, and headed the group which selected the textile and Gradall projects in the postwar diversification program. He was elected a director in 1945. Mr. Beatty



ONE OIL DOES TWO JOBS

One New Sunicut Grade with Petrofac* Replaces Two Oils, Gives Improved Performance and Lowers Costs

Part: Knurled rise nuts for Stillson wrenches

Operation: Spot, drill, knurl, and cut off

Machines: New Britain Model 61's

Materials: SAE X1112 and X1113 Bar Stock

Tools: Rex AA High-Speed Tool Steel

Cutting Speed: 156 S.F.P.M.

Cycle Time: 9.9 seconds

Production: 363 pieces per hour per machine

A manufacturer of wrenches was using two oils in his automatic screw machines—a dark cutting oil

and a lubricating oil. Replacing both with one grade of new Sunicut with Petrofac, he found the way to many benefits. Savings have been substantial. Dilution of cutting oil through seepage is no longer possible. Drain-off from chips is increased. There is only one oil to buy, store and handle. Finish is better, tool life longer, work visibility improved.

Because the new Sunicut grades with Petrofac possess superior metal-wetting, antiweld and extreme-pressure qualities, they are giving outstanding performance throughout the metal working industry. They are not blended with animal or vegetable fatty oils—cannot turn rancid. For more information write for folder S-7.

SUN OIL COMPANY • Philadelphia 3, Pa.

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Toronto and Montreal

SUN PETROLEUM PRODUCTS

"JOB PROVED" IN EVERY INDUSTRY



*Petrofac is a trademark of Sun Oil Company.

for a number of years was associated with Austin-Western Road Machinery Co. in sales and distribution. During the war he was assistant manager, Consairway Division, Consolidated Vultee Aircraft Corp., and joined Warner & Swasey in 1946 to develop Gradall distribution as assistant sales manager of the company.

Fred B. Riggan has been appointed general manager in charge of manufacturing at the Key Co.'s plant in East St. Louis, Ill. He formerly was foundry superintendent, and is succeeded in that position by **Arnold E. Czechowicz**, former assistant foundry superintendent.

Paramount Engineering & Mfg. Co., Kalamazoo, Mich., has appointed **Robert H. Schleuning** to represent its line of Pemco wheels in Ohio, Pennsylvania, West Virginia and New York. His headquarters will be in Pittsburgh.

Woodrow W. West has been appointed chief sales engineer, Pennsylvania Crusher Co., division of Bath Iron Works, Bath, Me. He will be located at the main offices of the division in Philadelphia.

Leonard G. Daniels has been named to the executive staff of Precision Metalsmiths Inc., Cleveland, as metallurgist heading the newly created engineering-design department.

Richard S. Boutelle, general manager of the Hagerstown, Md., plant, Fairchild Engine & Airplane Corp., New York, has been elected president; **Arthur F. Flood** as Hagerstown vice president, controller and treasurer; **Myron B. Gordon**, vice president; **T. A. Sims**, vice president, Atomic Di-

vision; **George F. Chapline**, vice president, Ranger Division, and **Paul S. Cleveland**, secretary. **James A. Allis**, vice president of Grace National Bank in New York, has been elected chairman of the corporation's new board.

Thomas A. Kennally, vice president and assistant to the president, Philco Corp., Philadelphia, has been named president of the company's Electromaster Electric Range Division. He will also continue to serve as an officer and director of Philco, and as a member of the company's management committee.

Arthur E. Focke, research metallurgist for Diamond Chain Co., Indianapolis, will be the next president of the American Society for Metals, Cleveland, and will take office Oct. 19 at the annual ASM meeting during the National Metal Congress & Exposition in Cleveland. He has served as vice president of the society during the past year, and is succeeded by **Walter E. Jominy**, staff engineer, Chrysler Corp.

K. W. Rhoads has been appointed to handle the sales activities in metropolitan New York, New York state and New England for the Detroit Electric Furnace Division, Kuhlman Electric Co., Bay City, Mich. He will be located in the Eastern Division sales office in New York.

Nathaniel B. Randolph has been elected president of Granite City Steel Co., Granite City, Ill., succeeding the late **Hayward Niedringhaus**. **George B. Schierberg** has been elected vice president, **John N. Marshall**, chairman of the board and chairman of the executive committee, and **J. P. Erwin Niedringhaus**, a member of the board of directors. Mr. Randolph, associated with the company for 29 years, has

served as vice president and general manager of sales since 1937, and also as a member of the board of directors. Mr. Schierberg, who replaces Mr. Randolph as vice president, is secretary-treasurer of the company. Mr. Niedringhaus is assistant sales manager, manager of tin plate sales, and advertising manager.

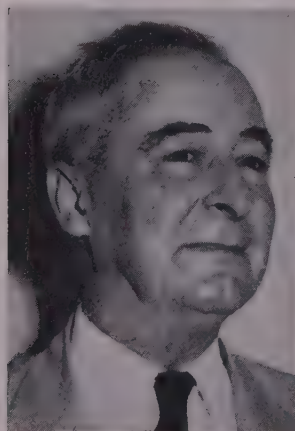
Walter A. Gorrell, recently retired president, E. J. McAleer Co., Philadelphia, has been named president of the Pressed Metal Institute, Cleveland. Until last spring he was chairman of the Philadelphia district.

W. L. Larson has been appointed division manager of the Wayne, Mich. Division, Gar Wood Industries. **Fra Hasselman**, formerly sales manager of the St. Paul Division, has been appointed division manager there, succeeding Mr. Larson.

In line with an expanded sales program, A. F. Holden Co., New Haven, Conn., announces the following promotions of field engineers to district managers: **M. K. Brintlinger**, Columbus, O.; **C. R. Brown**, New Haven, Conn.; **R. B. Durfee**, Skaneateles, N. Y.; **C. R. Hecker**, Plainfield, N. J.; **A. Moffat**, Lakewood, O.; **J. P. Shand**, New York; **R. L. Stephens**, Detroit; **J. W. Van Scoter**, Chicago.

Fred J. Walters, vice president, H. J. Point Inc., Chicago, has assumed responsibilities for direction of the company's marketing activities.

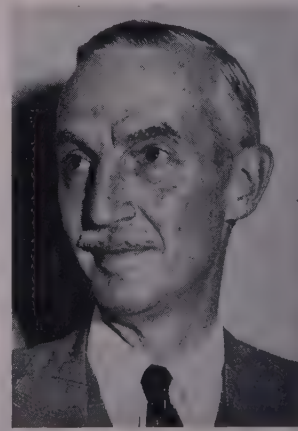
W. D. Bradshaw, associated with the Technical Division of mechanical goods, Goodyear Tire & Rubber Co., Wolverhampton, England, plant, has returned to England after completing six months' special training in the company's mechanical goods



NATHANIEL B. RANDOLPH



GEORGE B. SCHIERBERG



JOHN N. MARSHALL

MACHINES MADE LIGHTER, MIGHTIER, WITH REYNOLDS ALUMINUM

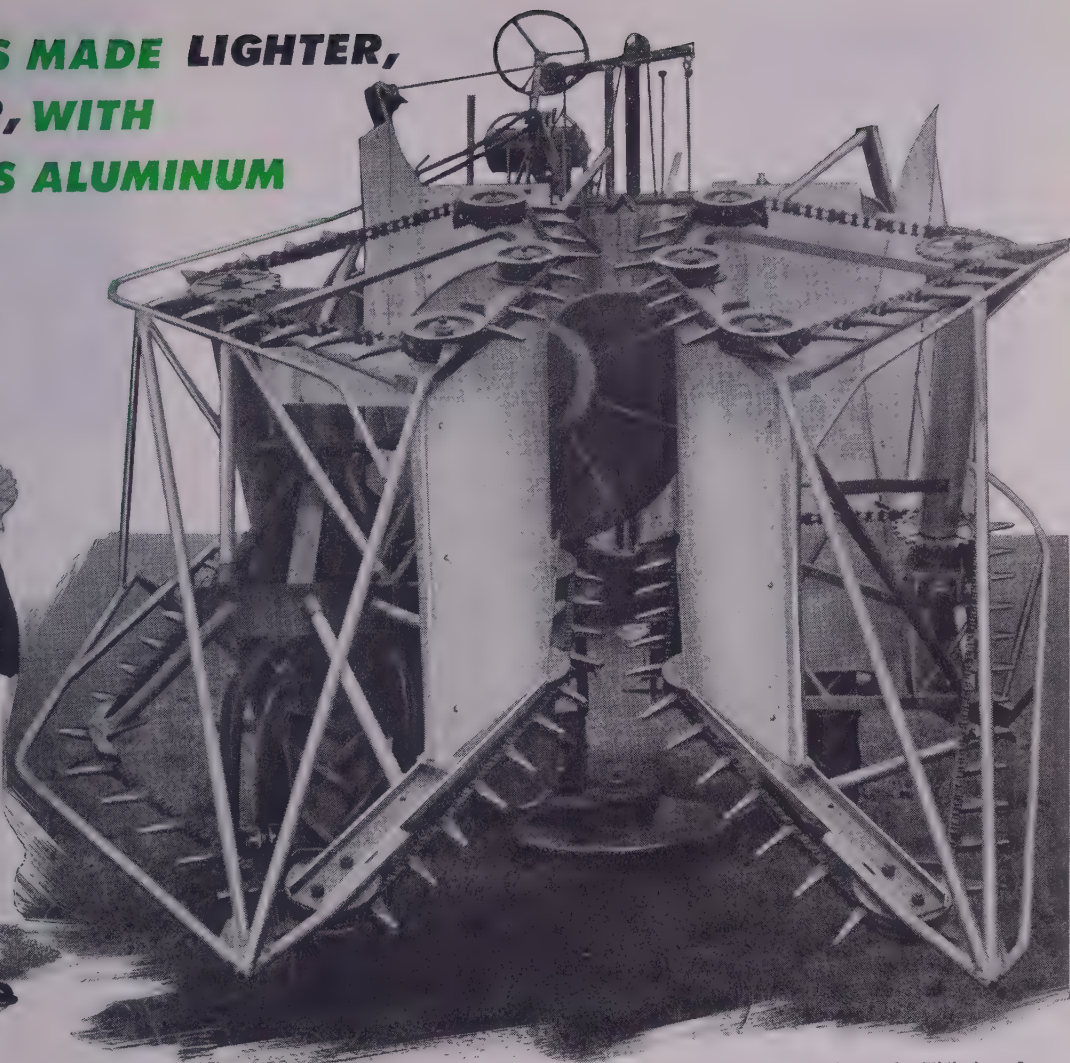


Photo courtesy Thomson Machinery Co., Thibodaux, La.

MUCH of the cost of raising sugar cane is in the cutting. The cane harvester in the picture above used to be overweight, had trouble getting over wet ground, until aluminum replaced many heavy parts.

The manufacturer redesigned with aluminum—used aluminum bar and structurals in the frame work, replaced cast iron gear cases with strong, heat-treated aluminum castings. In fact, nearly 30% reduction of dead weight was made without sacrifice of strength. This allowed more engine—30 hp was added—never attainable with heavier metals. Now more cane is cut faster and harvest costs are lower, because lighter aluminum enabled the making of a mightier machine.

Here's proof of the part aluminum can play in improving your product. There are many kinds of aluminum that do many different jobs, better. Aluminum lets you forget rust, gives you a metal that's easier and faster to handle;

it's strong even though $\frac{1}{3}$ the weight of other metal. You can save on finishing cost—aluminum's bright natural finish stays bright. Shipping costs are less and sales appeal is tops. You can have all these benefits in extrusions, structurals, sheet, screw machine stock, wire, rod, bar and special shapes—in a wide range of alloys and tempers.

To get the lift of aluminum for your product, get the help of Reynolds experienced technicians. Call the nearest Reynolds Office, listed under "Aluminum" in the classified section of your telephone directory, or write to Reynolds Metals Company, Aluminum Division, 2520 South Third Street, Louisville 1, Kentucky.



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Send your request for this informative book on your company letterhead and receive your copy without charge.



REYNOLDS Lifetime ALUMINUM

CONSIDER ALUMINUM—CONSULT REYNOLDS—A COMPLETE ALUMINUM SERVICE



FRANK L. SNYDER

plant in the United States. **E. M. Burger**, who completed a training course in foreign operations at plant 2 in Akron, has been assigned to the company's Mexico City plant as manager of mechanical goods development and technical service.

Frank L. Snyder has been appointed manager of the Transformer Division, Sharon, Pa., for Westinghouse Electric Corp. He succeeds **John K. Hodnette**, vice president, who recently became general manager of industrial products at Pittsburgh. Mr. Snyder, who joined Westinghouse in 1925 as a design engineer in the Transformer Division, has been engineering manager in the division since 1940. **E. C. Whitney** has been appointed manager of the large salient-pole generator section, A-C engineering department of the Transportation & Generator Division, succeeding **A. M. Goodison**, resigned.

P. H. Batten, chairman of the board, Twin Disc Clutch Co., Racine, Wis., was awarded the degree of doctor of engineering by Purdue University, Lafayette, Ind.

William J. Tunny has been appointed superintendent of electrical maintenance at the Indiana Harbor plants, East Chicago, Ind., for Youngstown Sheet & Tube Co.

T. W. Lippert has been appointed manager of publications, American Institute of Mining & Metallurgical Engineers, New York. For 16 years he was associated with the *Iron Age*, in latter years serving as directing editor.

A. T. Timmerman has been appointed representative of Automatic Control Co., St. Paul, in the eastern Wisconsin and Michigan peninsula

territory. He will handle engineering and sales of automatic liquid level controls, and will be available for information and service on all Autocon installations.

William T. Macdonald and **Kenneth Gregory**, who were formerly in the engineering office of Bigelow-Liptak Corp., Detroit, have been appointed sales representatives. Mr. Macdonald will be located in Cleveland, and will handle northern Ohio territory; Mr. Gregory will work out of Detroit, handling the Michigan territory formerly covered by the late **Walter F. Welsh**.

Cloyd Gray, president, W. R. Ames Co., San Francisco, has been named president of the California Metal Trades Association, an organization of metal fabricators.

Gerald H. Karlen has been appointed district representative in metropolitan New York, Connecticut, Rhode Island and Massachusetts for Westcott Chuck Co., Oneida, N. Y.

David Edelstein has been named scrap purchasing agent for the eastern territory of Federated Metals Division, American Smelting & Refining Co., New York. He will also act as assistant to the general manager of scrap purchases, **Paul Herzog**.

Murray Hauptman has been appointed chief inspector and process engineer, Detroit Harvester Co., Detroit. He served as process engineer for Graham-Paige Motors Corp. before joining Detroit Harvester in 1945.

William M. Hissick has been appointed superintendent of a new plant of Nineteen Hundred Corp., Chicago, in which washers and dryers are manufactured. He formerly was connected with General Electric Co.'s division in Bridgeport, Conn.

Chester H. Lehman, executive vice president, Blaw-Knox Co., Pittsburgh, has returned to this country after spending six weeks in Europe visiting the company's subsidiaries, affiliates and agencies.

W. C. Denison Jr., president, Denison Engineering Co., Columbus, O., now is on a world-wide tour as a member of the Town Hall World Seminar.

Clyde C. Randolph has been named works manager of the Buffalo and Allentown, Pa., plants of Western Electric Co., and acting manager of



C. J. BENEKE

the Point Breeze works at Baltimore. He will have headquarters in New York. Formerly manager of the company's radio shops, Mr. Randolph succeeds **Arthur B. Goetze**, recently elected vice president, Chesapeake Potomac Telephone Co.

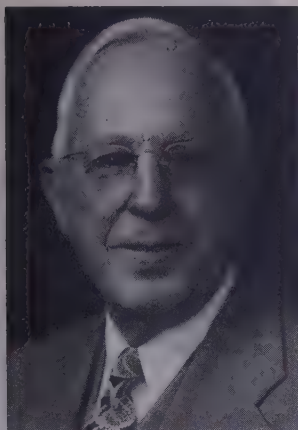
C. J. Beneke has been appointed product manager for the Wire, Rod, Bar, Structural & Cable Division of Reynolds Metals Co. in Louisville. He joined the company in 1940, and set up its plant 7 merchant mill including its practices and personnel for production of wire, rod and bar. He later set up the structural mill at Listerhill, Ala., for production of large rods and structural shapes, and supervised the extrusion plant 8 in Louisville during the latter part of the war.

Dominic F. Cannon has been appointed superintendent of Works No. 4 at Ford City, Pa., for Pittsburgh Plate Glass Co. He succeeds **W. C. Watson**, retired after completing 40 years' service in the Glass Division manufacturing department. Other promotions are **Ralph V. Reisgen** from plant engineer to first assistant superintendent, and **Vance S. Firstone** from assistant plant engineer to plant engineer.

William H. Cantt has retired as assistant traffic manager, Bethlehem Steel Co., Bethlehem, Pa., with which he has been associated since 1918.

Joseph B. Horwitz has been appointed to the finance committee of the Institute of Scrap Iron & Steel Inc., Washington.

Wilbur A. Howe has been appointed manager of engineering and service for the Pacific Coast district of Westinghouse Electric Corp., Pittsburgh.



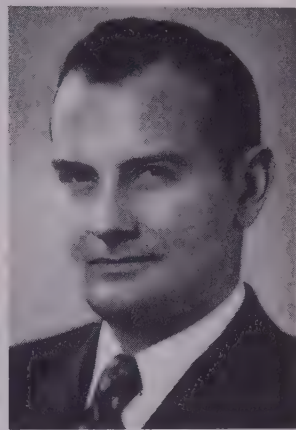
GEORGE W. BINNS

Elected vice president and director, Cincinnati Milling & Grinding Machines Inc., Cincinnati. Noted in STEEL, July 18 issue, p. 74



LESTER F. NENNINGER

Elected vice president and director, Cincinnati Milling & Grinding Machines Inc., Cincinnati. Noted in STEEL, July 18 issue, p. 74



BERNARD DOLAN

Elected president, National Industrial Advertisers Association, New York. Noted in STEEL, June 20 issue, p. 70

burgh. He succeeds **A. W. Copley**, retired.

—○—

William W. Moore, a sales representative in the Detroit district office, Allis-Chalmers Mfg. Co., has been named manager of the company's newly converted Toledo, O., district office.

—○—

Carnegie-Illinois Steel Corp., subsidiary, U. S. Steel Corp., announces appointments in the executive personnel of its Gary Ind., works. **Paul E. Thomas**, chief engineer, becomes assistant to the general superintendent, and is succeeded by **Daniel E. Wise**, who has been serving as chief engineer of the company's Clairton, Pa., works.

—○—

Alan E. Aune, formerly manager, aircraft and automotive wire sales,

United States Rubber Co. Inc., New York, has joined **Burndy Engineering Co. Inc.**, New York.

—○—

James H. Davidson Jr. has been appointed sales and service engineer, and **Albert W. Bird**, service manager, Clinton Machine Co., Clinton, Mich. Mr. Davidson was formerly in the field product engineering department, Timken-Detroit Axle Co. Mr. Bird has been in Germany as a civilian working for the War Department. He was in charge of engineering and inspection at the Karlsfeld Ordnance Depot.

—○—

Edward R. Anderson has been appointed vice president, Kellogg Division, American Brake Shoe Co., New York. He will be located in San Francisco, where since 1947 he has been district sales manager of

the Pacific district. He will continue to serve in this capacity in addition to his new duties.

—○—

Pollack Steel Co., Cincinnati, announces appointment of **W. R. Klinkicht** as assistant general manager of the company.

—○—

Joseph C. Hess Jr. has been elected vice president in charge of production, Leeds & Northrup Co., Philadelphia. Formerly assistant factory manager of the Germantown, Pa., plant, he succeeds **W. R. Coley**, retired after 43 years' association with the company.

—○—

Fred H. Pillsbury has been elected vice president in charge of operations, Century Electric Co., St. Louis. He has been serving as executive engineer.

OBITUARIES...

Charles R. Holton, 62, vice president in charge of purchases, Bethlehem Steel Co., Bethlehem, Pa., died July 16. He began his business career in 1901 with American Bridge Co., later joining Pennsylvania Steel Co., Steelton, Pa., where in 1906 he became secretary and assistant vice president. When this company was acquired by Bethlehem Steel Co., Mr. Holton joined Bethlehem as buyer. He had been a director of Bethlehem since 1935.

—○—

Edward E. Long, 57, secretary and assistant treasurer, Alan Wood Steel Co., Conshohocken, Pa., died July 7. He had been employed by the company continuously since 1914.

—○—

Hayden R. Mills, 48, executive vice

president, Bell-O-Matic Corp., Chicago, was killed July 13 in an automobile accident near Wheaton, Ill. Until last year Mr. Mills had been secretary-treasurer of Mills Industries Inc., Chicago.

—○—

John R. Comstock, 58, general superintendent, Pittsburgh Coke & Chemical Co., Pittsburgh, died July 14 at the Neville Island plant of the company. He had previous association with Hanna Furnace Corp., Detroit, and Globe Iron Co., Jackson, O. He joined Pittsburgh Coke & Chemical in 1943.

—○—

H. C. J. Hambach, warehouse superintendent of the Philadelphia branch of Edgcomb Steel Co., died recently.

—○—

Charles F. Pease, 84, retired inventor and founder, C. F. Pease Co., Chicago,

maker of blue printing machinery, died in Altadena, Calif., July 16.

—○—

Steven Kobzy, 64, chairman and founder, Kobzy Tool Co., Chicago, died July 13.

—○—

Frederick A. Poole Jr., 41, president, Poole Mfg. Co., Chicago, subsidiary, Production Instrument Co., died July 15.

—○—

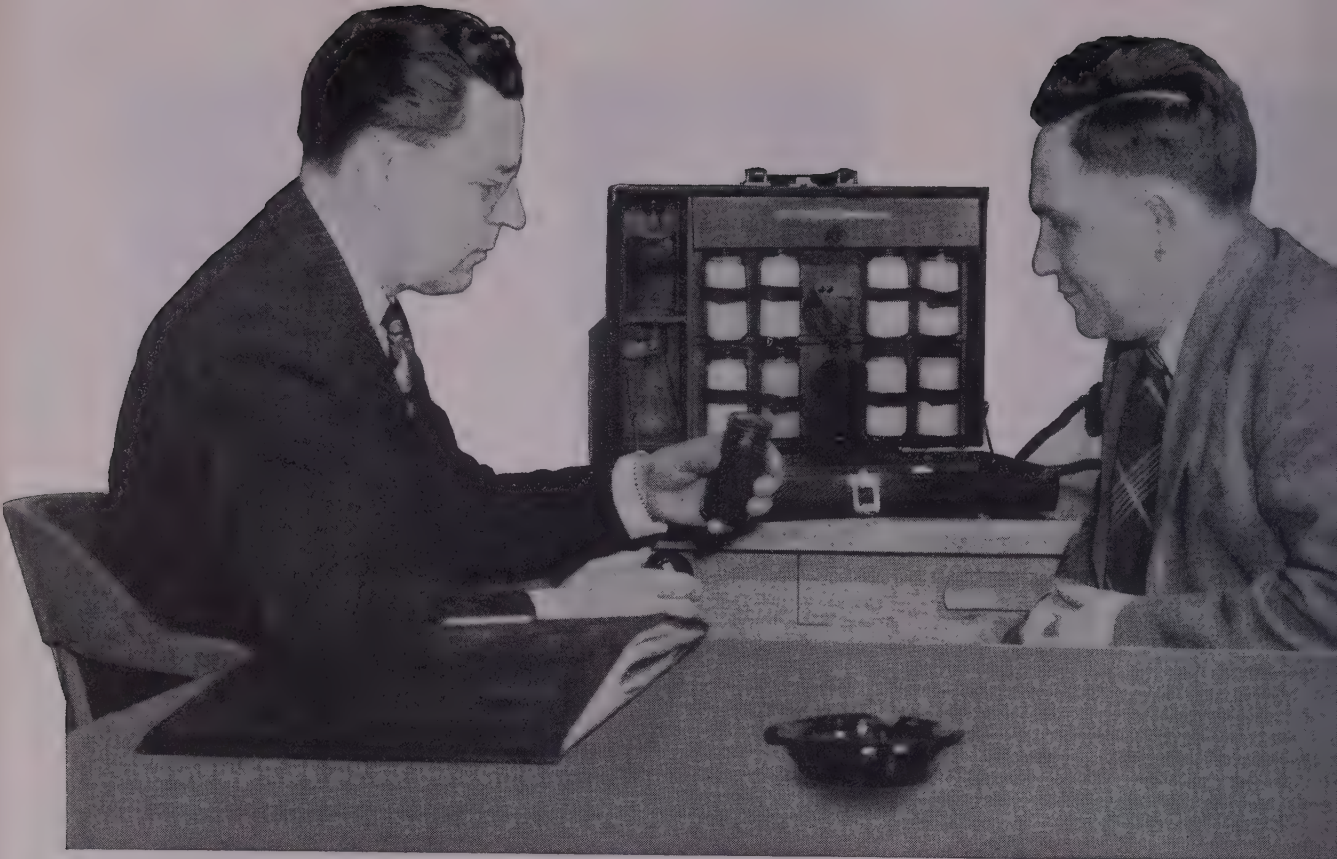
Edward L. Baker, 80, one-time director, J. I. Case Threshing Machine Co., forerunner of J. I. Case Co., Racine, Wis., died recently.

—○—

Elmer E. Olson, 66, vice president, Republic Metals Inc., Chicago, died July 14.

—○—

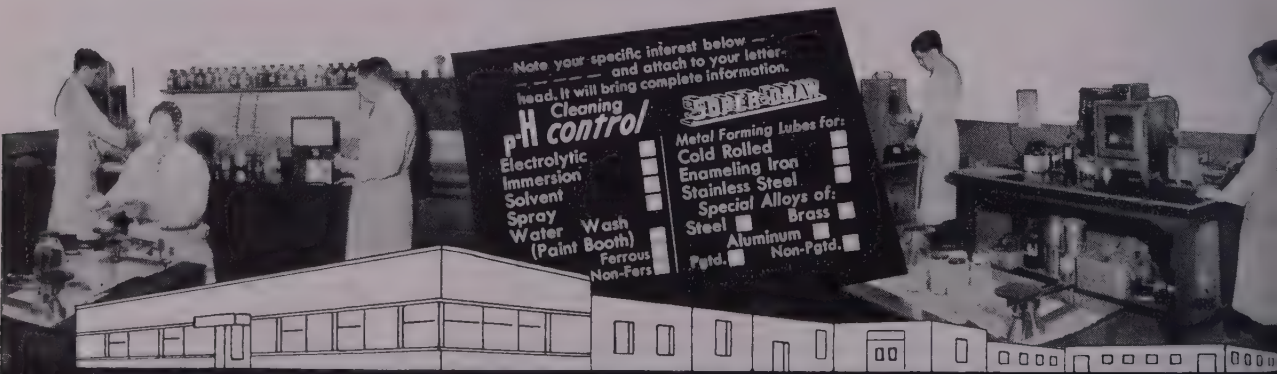
Ward S. Perry, 63, president, Volta Battery Corp., Chicago, died July 18.



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Because NORTHWEST products have a distinctive appearance, our men have always carried samples. Now they are equipped with a case in which products in general use are carried together with equipment for their control. There are liquids and powders—some for use individually, others in combination to get the correct pH for the type of soil to be

removed . . . NORTHWEST men are thoroughly experienced in all phases of cleaning and surface preparation. They make the correct recommendation as to which product or products to use—handle their installation and set up their control . . . Ask the NORTHWEST man to SHOW you as well as tell you what he can do for you . . .



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9310 ROSELAWN AVE. DETROIT 4, MICH.



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"PERPETUAL" OPERATION—In Reading, Pa., it was learned, 13 GE Calrod cast-in immersion heaters installed 4 years ago by Reading Batteries Corp., for use in four 2000-pound lead melting pots have piled up some 125,464 continuous hours of service without maintenance—thereby providing a 25 per cent increase in production. Pots are used to melt pigs of antimonial lead for molding grids and other lead parts of auto and aircraft batteries. During an 8-hour period an average of 10,000 pounds of metal for casting grids is removed from the heated pots which are maintained at a temperature of 800° F.

WELDS CUT CAR COSTS— Typical new automobile today includes up to 10,000 separate welds as against 6000 incorporated in 1941 models according to automotive welding engineers. Current automatic welding presses up to 8 feet wide and 10 feet long, they report, can fire up to 300 resistance-weld guns in a split second, making joints up to 10 feet in length. Welding dies for small car parts now are self-contained, and can be installed quickly on the presses as production run on one car part ends and another begins. These high-speed operations cut by 75 per cent the time required for most welding jobs.

NO PLANT SMOG— Internal air pollution is a thing of the past in the modern foundry of Crucible Steel Castings Co. Use of roof-top exhaust fans made by Powermatic Ventilator Co., enables the Cleveland concern to exhaust impure air from its shakeout operations at the rate of 40,000 cubic feet per minute. Another fan located in a stack above the electric melting furnace ejects the heavy smoke immediately high into the air above the plant. Currently, Crucible is employing 12 such exhausting fans, ranging in size from 36 to 60 inches in diameter—the largest being over the shakeout.

CUTS INSPECTION COSTS—Modified double sampling plan developed in National Bureau of Standard's statistical engineering lab, is reported to cut costs of inspection by some 20 to 40 per cent. Plan is a substitute for the usual single sampling plan. It involves drawing the same number of units as in the single sample case, but the regular testing procedure is interrupted after a fixed number of items is tested. If a predetermined number of the test results individually exceeds the acceptance value of the original plan, the material is immediately accepted and testing stopped. If less than the required number meets the acceptance value, testing is completed in the usual way and individual test results are averaged. Acceptance or rejection depends on whether or not this average exceeds the acceptance value.

FIFTEEN-SECOND DEGREASING—Completely degreased steel barrel is ejected every 15 seconds by a mechanical setup employed by Cleveland Steel Barrel Co. Installation, which processes some 250 barrels per hour, is kept continuously heated by thermostatic controlled immersion heaters that keep the washing solution at a temperature of 130° F, an important factor in the speedy processing. Barrel washing consists of placing units on a conveyor, pushing them one at a time into the tank. After a 15-second "scrub," each barrel is pushed out of the opposite side of the tank by an automatic mechanism—directly into a drying chamber.

BACKTRACKING PROCEDURE —

In setting up operations for cold shaping steel, preliminary calculations must be made to determine the shape of the successive operations which will deliver the required physical properties. These, however, can be limited to the determination of various cross sectional areas necessary to produce the required items in the fewest operations within the limits of the cold working methods used. Layout of operations, it is pointed out, must be started by working backward from the final piece. (p. 58)

SILVER IN BEARINGS — Recent careful and detailed studies of bearings removed from turbine engines revealed that the principal source of difficulty came from the roller separator or retainer. In attempting to correct this condition through numerous tests, it was found that a silver-surfaced separator provided remarkable performance. Most amazing, it enabled a bearing to operate several hours without lubrication before breaking down. Reason is still a question for much speculation. It is known that molten silver will not wet steel, and this may be the factor in minimizing to a large degree the transfer of silver to mating steel surfaces. (p. 61)

SHEARING TIPS—Modern squaring shears can effect considerable savings in producing accurate straight-sided blanks for stamping and forming without need for blanking dies. Besides being fast producers, they save much handling time and make cuts parallel within 0.005-inch in 10-foot strips. But before a shear can produce blanks without dies, it must be rugged and free from accuracy-robbing deflections. (p. 64)

FAST "CONVERSION" — Recently completed rolling mill addition at Newport Steel Corp., Newport, Ky., is believed to be the only integrated unit in existence capable of rolling steel from ingot to finished coil in about 6 minutes without intermediate reheating. The plant, estimated to be capable of processing 60,000 tons of ingots monthly on a 15-turn week, represents an outlay of \$11 million, including construction of two 60-ton electric furnaces. (p. 66)

Cold Shaping

COLD shaping of steel is the application of several different processes for plastic deformation to produce cold worked products. This article is limited to applications of the processes to low carbon steels with circular cross sections, treated with a phosphate coating and properly lubricated. Processes include cupping, drawing, coining, heading, necking and extruding.

Cupping is performed on items when the initial operation requires relatively small wall and bottom thickness as compared to the diameter. Lengths to be used for such operations are relatively thin when compared to their diameters. Tapered punches can produce greater reductions in diameter (blank to cup) and wall thickness than can be obtained with cylindrical punches. It is possible, by using tandem dies, in which the second die ring is a drawing ring, and with tapered punches, to reduce the blank thickness a total of 60 per cent. In such tandem dies there is no reduction of the inner diameter, but only a reduction in wall thickness from the first to the second die ring.

In drawing as applied to preformed cups, the limit of reduction in a single draw is:

$$\frac{A_0 - A_1}{A_0} \times 100 = \frac{(D_0^2 - d_0^2) - (D_1^2 - d_1^2)}{(D_0^2 - d_0^2)} \times 100 = 40\%$$

A_0 = area of cross section before drawing
 A_1 = area of cross section after drawing
 D_0 = outer diameter of shell before drawing
 d_0 = inner diameter of shell before drawing
 D_1 = outer diameter of shell after drawing
 d_1 = inner diameter of shell after drawing

The preceding limits are for annealed cups and the reduction of inner diameter is limited to 20 per cent whether or not a reduction in wall thickness is involved.

Coining, which is in many cases an upsetting or indenting operation, is a process for forming blanks or heads of cups into accurate shapes. The increase in wall thickness during such an operation is limited to about 200 per cent of the original section. Reduction of thickness in a piece is limited from $\frac{1}{8}$ to $\frac{1}{2}$ of the original thickness because of the high unit stresses which will occur when the surfaces of the punch and die come too closely together.

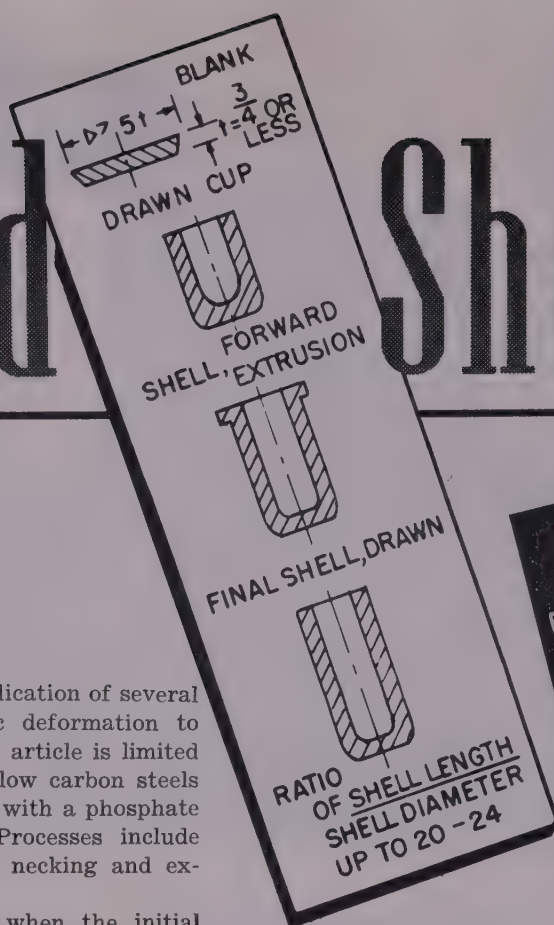


Fig. 1—Characteristic sequence of operations usually used in cold shaping of shells

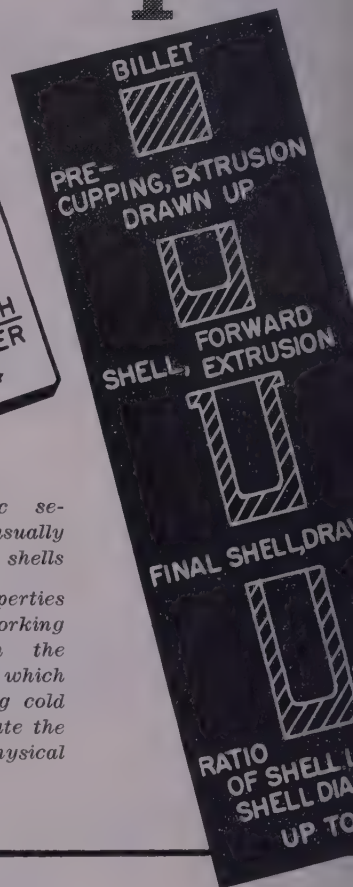


Fig. 2—Physical properties of steel after cold working are dependent upon the amount of deformation which has taken place during cold working. Curves indicate the trend of the various physical properties

If cups to be coined have a relatively thin bottom as compared with their diameter, the above shown limits must be greatly reduced because of the extremely high unit pressures which are governed by the shape factor of the section to be coined.

Heading is generally an upsetting operation. Limits to the height of the section to be headed are 2 to 2.5 times its diameter, or other small thickness in the case of hollow sections. The limit for increase in diameter in solid rods and in wall thickness is 1.4 to 1.5 times the original section, i.e., approximately 40 per cent increase of cross sectional area. The limits are much lower if the height of the part is low in comparison to its diameter.

Necking is used to reduce the diameter of the open end of a tube, keeping the cross sectional area constant. Uniform better results can be obtained if the pieces have been slightly cold worked. Thin wall tubes may be reduced in diameter 5 to 15 per cent.

Steel

Practicability of cold shaping low carbon steels by extrusion with the aid of special surface treatments is revealed by studies recently completed by Heintz Mfg. Co., Philadelphia, in connection with a government research and development project. Based on Department of Commerce summary report PB 96704, this article evaluates cold shaping processes in terms of both industrial and ordnance applications

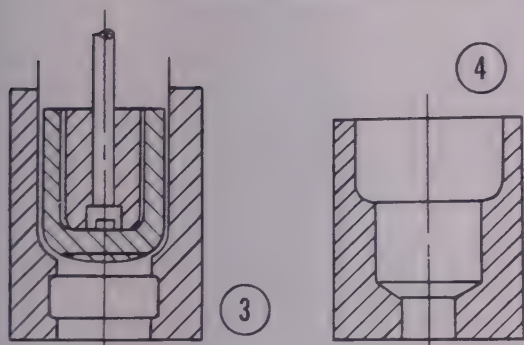
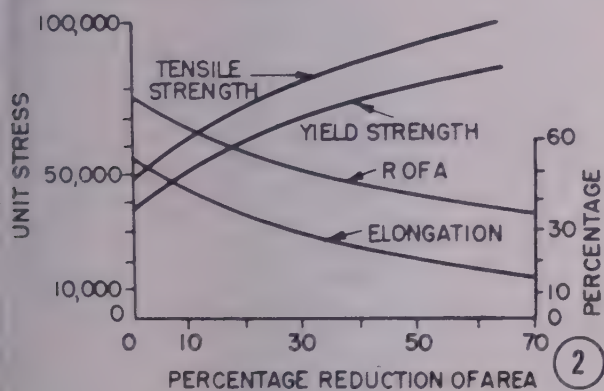


Fig. 3—Setup for forward extrusion

Fig. 4—Bushing for extrusion backward

while tubes with comparatively thicker wall sections may be reduced 20 per cent.

Backward extrusion is a process similar to piercing for converting solid billets into cups. Limits of the operation are governed by the relationship of the diameter of the hole to the length of the punch. The practical limit of the length of the piercing punch is three times its diameter. This limit can sometimes be raised to three or four times the diameter of the punch if a guide bushing is used to reduce the column action of the punch. Nose of the punch should have a 3 to 5-degree taper or a slight crown to reduce impact on the punch and to facilitate flow of steel.

Forward extrusion is a process during which the extruded parts move in the same direction as the punch. It can produce in one operation extreme reductions in cross sectional area. Maximum such reduction is beyond 75 per cent. The process is best applied to parts whose cup diameter is 1 inch or

greater because of the high unit stress created in the dies. Length of the cup to be extruded is usually limited to five or six times its diameter because of the high percentage of power absorbed in overcoming friction. Backward and forward extrusion can also be combined.

Material—Cold shaping, especially cold extrusion, it was thought in Germany, was practically limited to the use of deep drawing quality low carbon, nonaging, aluminum killed steel. Trials in this country have been successful in extruding to an extreme degree mill run qualities of low carbon steel. Recommended chemical analysis is as follows: C—0.10 max., Mn—0.50 max., Si—below C, P—0.04 max., S—0.04 (P and S 0.07 max.) Ni—less than 0.02-0.03, Cr—less than 0.02-0.03, Ni+Cr+Cu—0.03-0.04 max., Cu—less than 0.02-0.03.

A range in carbon and manganese content has been found practical. Some incidentals, especially chromium, nickel and copper have been found to have a limiting influence on cold shaping because they tend to increase flow resistance.

Steel stock preferred for cold extrusion should be completely free of nonmetallic inclusions as well as any directional structure. The ideal grain would be a fine homogeneous structure such as shown by grain sized charts ASTM, E19-39T, No. 5 or smaller in a spheroidized condition.

Cold shaping, both in Europe and in the experimentation reported here, has been limited to low carbon steel with a carbon content ranging from 0.06 to 0.20 and manganese content from 0.12 to 0.82. Physical properties vary to a great extent, depending upon the carbon content of the steel used as indicated in Table I.

Uniform physical properties in the steel stock are very important. Steel in the "as rolled" condition will vary greatly in this respect. It may therefore be the best to anneal, and in some cases, to normalize and anneal material to be used for extreme reduction.

Physical properties of steel after cold working are dependent upon the amount of deformation which has

TABLE I
PHYSICAL PROPERTIES AND CARBON CONTENT
OF STEEL STOCK

	C—.09 Mn .33	C—.19 Mn .32
Rockwell B	40-63	60-65
Reduction of area	74.45%	63.90%
Elongation (2")	45.31%	37.50%
Yield strength (drop of beam)	38,825 psi	39,500 psi
Tensile strength	47,650 psi	59,200 psi

taken place during cold working. Curves in Fig. 2 indicate the trend of the various physical properties.

These curves are similar but not identical for all cold working operations, because varying die conditions cause different friction and nonuniform stress conditions, which in turn affect the physical properties of the piece. For instance, if a piece were drawn in three operations to reduction in cross section of 70 per cent, the tensile strength results would show higher yield and tensile strength with lower reduction of area and elongation factors than if the 70 per cent reduction had been performed in one extrusion operation.

It is well known that grain growing takes place in steel that has been critically deformed (2 to 15 per cent) and is subjected to too high annealing temperature; its impact strength is also reduced. The impact strength of such sections will tend to drop even further after succeeding cold working and annealing operations to the point where it is almost zero, especially at subzero temperatures. Normalizing with a fast cooling rate to below the lower critical temperature will restore the impact strength of the stock.

Annealing Heat Treatment—For pieces which require more than one extrusion operation an intermediate annealing operation is usually necessary to restore the ductility of the material. Assuming that the grain size and other metallurgical properties in the billet stock are acceptable, then intermediate annealing need only be a stress relief anneal. Annealing temperatures should be as low as possible and of sufficient length to restore the original grain structure without grain growth. The proper temperature and time for such an operation depend mainly upon the carbon content of the steel.

Limitation of Drawing and Extruding—Generally,

in drawing operations external friction is a comparatively large amount of the total work because the slender die angle used. With a half die angle of 6 degrees and a coefficient of friction of 0.1, the total work consumed will be about twice that of the frictionless drawing (stretching).

Maximum reduction of area that can be made in drawing is about half the reduction of area that could be gotten on a tensile test specimen made of the same steel stock.

Drawing speed ranges from 4 to 8 inches per second corresponding to an inlet speed of about 2 to 4 inches per second. Speed is limited by impact at the beginning of the stroke and by the fact that on heavy reductions a certain amount of strain hardening is necessary in the reduced section to enable it to withstand the pull through the draw ring.

Extrusion operation requires about twice the power consumption required by drawing operation because of the high nonuniform stresses caused by the large die angle of the extrusion die. The effective elongation of part at the nozzle is assumed to be comparative to the true elongation which corresponds to the reduction of area in a tensile test specimen of the same steel stock. Heat created in the die nozzle, which increases the ductility of the material accordingly, contributes to the degree of elongation possible.

Application of extrusion is generally limited to the stresses that the die material can stand. Impact limits the contact speed to about 10 inches per second, which corresponds to an average working speed of about 6 to 8 inches per second and outlet speed of about 12 to 24 inches per second on a mechanical press.

Temperature of the surface of work being drawn has been found to range approximately between 300 and 400° F, with the temperature in the steel assumed to be lower. Surface temperature of extruded parts has been found to be up to 500° F.

Because it is known that high temperature reduces flow stress, it has been proposed to start extrusion operations with the steel stock at about 200 to 400° F. This involves other problems, especially friction and lubrication conditions at high temperatures which have not been fully investigated. It is assumed that the temperature of the work should be maintained below 500 to 700° F, the so-called "brittleness" range.

Calculation and Design of Operations—Layout of operations must be started by working backward from the final piece. Total volume of material required is calculated by dividing the piece into comparatively simple volumetric sections and adding any necessary machine finishing required for total volume of material.

When physical properties are specifically required it is necessary to plan operations to provide the percentage of reduction after the final annealing operation in order to meet the desired requirements. Physical properties will vary with various low carbon steels and different amounts of cold working. Although true stress diagrams may be used to some extent to determine these properties, tensile tests on various cold work sections give a more complete picture because of the residual stress in cold work sections. If the cold (Please turn to Page 94)



Fig. 5—Setup for long extrusion with a small diameter and a thick wall

Silver-Surfacing

Improves Performance of Gas Turbine Roller Bearings

Studies of lubricating problems and metal transfer from separator to inner race, rolls and outer race of bearings operated at high speed, high load and high temperature reveal that silver-plating the brass separator prolongs bearing life remarkably and reduces metal transfer under poor lubricating conditions. Bearings are even capable of operating several hours without lubrication before failure

By DONALD F. WILCOCK

and

FREDERICK C. JONES

Thomson Laboratory
General Electric Co.
West Lynn, Mass.

REAT reliance has been placed upon bearing quality in the application of roller bearings to gas turbines. However, the increased demands which are placed upon gas turbine bearings by way of conditions of high speed, high load and high temperature, either singly or in combination, have resulted in operating conditions which at times may be marginal. Recent efforts to remove such marginal conditions and to replace them with the certitude of a reasonable safety factor have been facilitated by the willing co-operation of the bearing manufacturers who have prepared many sample bearings for test, on special order.

A careful and detailed examination of bearings removed from turbine engines has revealed that the principal source of difficulty lies not in the steel races, not in the steel rollers, but in the roller separator or retainer. The separator normally used in these high-speed, high-temperature bearings is made of free-machining yellow brass. It is guided, or held in place, by sliding on shoulders on the inner race of the bearing. This portion of the bearing consists, therefore, of a sleeve bearing with a length extremely short compared to its diameter. Sliding between the separator and its inner race guide, and between the separator and the rollers which it spaces and by which it is driven requires excellent lubrication at these points. This is difficult to provide during starting and stopping when the sliding velocities are low.

Very low viscosity oils used in aircraft gas turbines to obtain satisfactory low-temperature starting characteristics make it more difficult to build up a separating oil film between the parts of the bearings used in such engines and, in addition, impose the

hazard that the bearing adjacent to the turbine wheel may become hot enough after the engine stops to volatilize most of the oil from its surfaces.

Rubbing off of brass onto the steel parts has been noted on some bearings. Bearings which have failed in special engine tests show considerable smearing of brass upon the working parts, and usually broken retainers. It is thought that brass transferred to the steel parts by rubbing may under particularly adverse conditions weld to the brass retainer and result in a momentary halting of the retainer, skidding of the rolls, and breakage of the retainer.

In order to study full size bearings under controlled conditions, a laboratory test stand was constructed capable of simulating engine operating conditions of speed, load and temperature. With this machine, separator lubrication was studied and the possibility of improving performance by the use of other separator materials demonstrated. A number of general conclusions were reached as a result of these studies:

1. No difficulty is experienced in lubricating the roller bearings when they are running at high speed and are lubricated with a continuous jet of AN-9-9 grade 1010 oil.

2. Numerous starts and stops under lubricated conditions result in small amounts of brass being transferred to the steel parts upon which the separator slides. When the steel parts have been oxide coated to provide protection against corrosion,

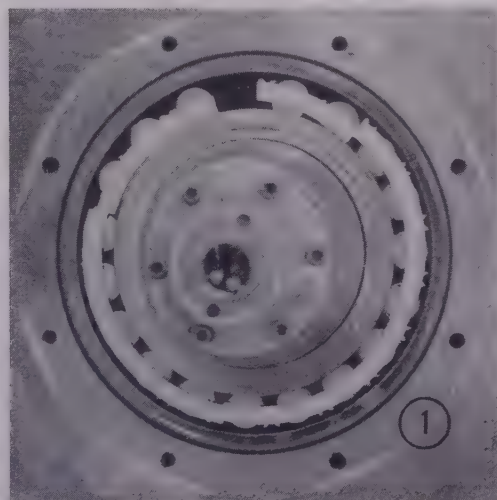
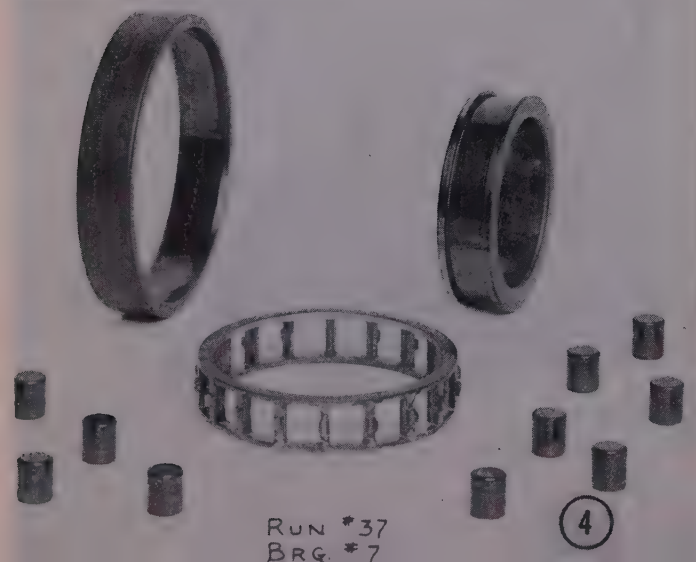
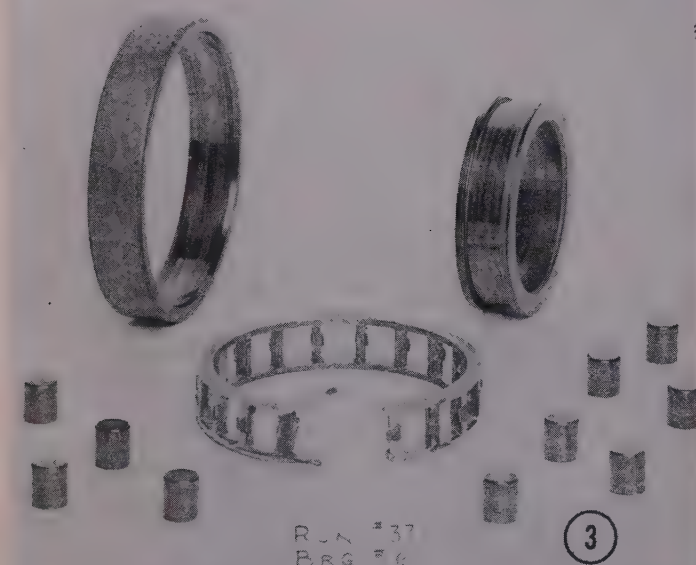
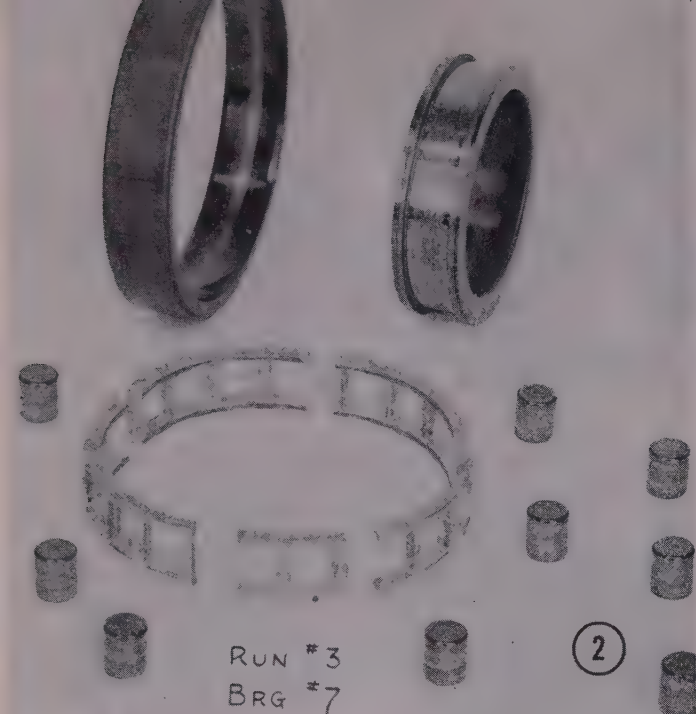


Fig. 1—Brass separator bearing after failure and before removal from bearing housings. Broken separator is clearly visible

From data presented before the fourth annual meeting, American Society of Lubrication Engineers, New York, April, 1949.



brass transfer is found to be more severe.

3. Dry operation of the bearings results in rapid failure and destruction of the separator in a matter of minutes.

4. Separator materials other than brass have been found which greatly improve separator operation under adverse conditions. Silver plating the brass separator prolongs bearing life operating under several fold and greatly reduces metal transfer under poor lubrication conditions. It is the best of a number of electroplates which were tested.

5. Other separator designs in which the separator is guided by the rolls rather than by the inner race may be better for operation under poor lubrication conditions, particularly when they include the use of better materials. These tests are still incomplete.

Test Procedures—A significant part of this investigation lies in the study of transfer of metal from the separator to the inner race, rolls, and outer race of the bearing. With a brass separator and bright steel parts, brass which has been transferred to the steel is readily detected because of the color contrast. However, silver and tin alloys are not readily detectable visually on steel except when present in large quantities; and, when a varnish film has formed on the steel parts, it is difficult to detect small amounts of brass. Therefore, where there was any doubt as to the presence of transferred separator material on steel parts, they were treated by immersing them in an H_2S atmosphere for several minutes. This treatment formed sulphides which were dark enough to be readily distinguishable from the steel surface.

Test conditions used in studying these 95 mm light series roller bearings were as follows:

Speed 7550 rpm
Radial Load 500 pounds

Fig. 2—Same bearing as shown in Fig. 1 after removal from test machine

Fig. 3—Bearing with a silver-plated separator which failed after 6 hours and 49 minutes

Fig. 4—Another bearing with silver-plated separator which had not failed at the time given for bearing shown in Fig. 3

TABLE I
COMPARISON OF RUNNING TIME TO FAILURE OF 95 MM ROLLER BEARINGS WITH BRASS AND SILVER-PLATED SEPARATORS, PROCEDURE E (DRY OPERATION TO FAILURE)

Time to Failure, Minutes			
Proc. E1—New Bearings		Proc. E2—Run-In Bearings	
Brass Separator	Silver-Plated Separator	Brass Separator	Silver-Plated Separator
0.85	0.23	4.00	4.93
1.08		2.77	7.85
0.25		1.02	5.73
0.30		4.33	
0.62 Min. Avg.		3.03 Min. Avg.	6.17 Min. Avg.

TABLE II
COMPARISON OF RUNNING TIME TO FAILURE OF 95 MM ROLLER BEARINGS WITH BRASS AND SILVER-PLATED SEPARATORS, PROCEDURE D (BAKED OIL OPERATION TO FAILURE)

Time to Failure, Minutes		
Brass Separator	Silver-Plated Separator	Dry Operation
4.17	409.	
6.81	72.	
0.32	395.	
3.77 Min. Avg.	292. Min. Avg.	3.03 Min. Avg.

Thrust Load None
Acceleration Full Speed in 8 seconds
Lubricant AN-0-9 Oil, Grade 1010

Under these conditions, lubrication of the roller bearings was studied, using a number of controlled test procedures. Some of these procedures were designed to simulate possible gas turbine operating conditions; others were designed to be much more severe than any conceivable operating conditions in order to cause rapid bearing failure. The several procedures used are described in detail below:

A. Steady Lubricated Run. Operation is continuous for 24 hours with grade 1010 oil furnished to each bearing at the rate of 0.5 gpm. Bearing temperatures are maintained at 120° C (238° F).

B. Multiple Starts. Oil is fed continuously to each bearing at the rate of 0.5 gpm, and bearing temperatures are maintained at 120° C (238° F). Seventy-five starts are made, with an operating period of 2 minutes and an off period of 5 minutes.

C. Delayed Lubrication Starts. After operating the bearings for 5 minutes with normal lubrication, they are stopped and heated to 187° C (369° F). After 2 hours at this temperature, the roller bearings are started dry and 10 seconds later oil is admitted. After 5 minutes running, this procedure is repeated until five starts have been made.

D. Baked Oil Operation to Failure. The roller bearings are installed in the test stand clean and dry and are heated to 130° C. Oil is turned on, and the bearings are operated at this temperature with oil feed for 5 minutes. They are stopped, heated to 218° C (425° F), and maintained at this temperature for 2 hours. During this period most of the oil vaporizes from the bearings, the residue being a slight varnish-like coating. After cooling to 187° C, the roller bearings are operated without lubrication until failure of one bearing stalls the test machine.

Before starting, the ball bearings supporting the test shaft are lubricated with a heavy oil by means of an oil can. If the roller bearings operate under these dry conditions for any prolonged period, the stand is stopped every 10 to 15 minutes, long enough to permit recoiling of the ball bearings. Oil spray or vapor from the ball bearings is prevented from en-

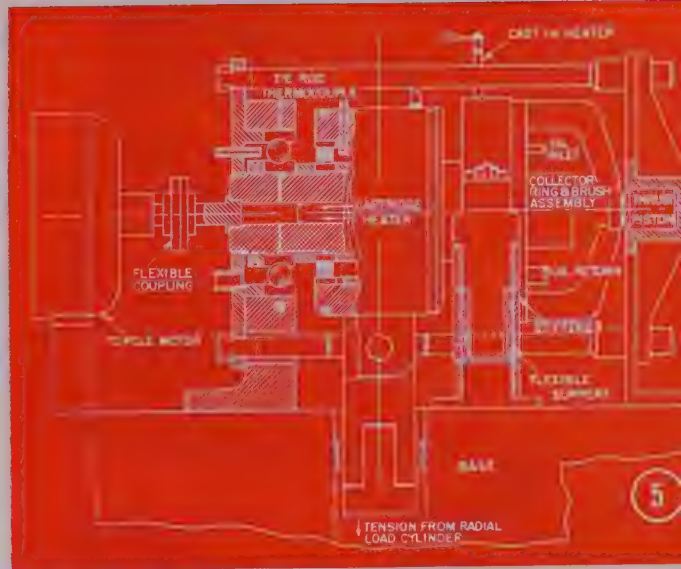


Fig. 5—Diagrammatic section of test stand. This apparatus was built to provide test conditions variable over a wide range for both roller and ball bearings

tering the roller bearing housing by means of shields.

E. Dry Operation to Failure. Method 1: New bearings, without previous operation are carefully cleaned in a volatile hydrocarbon solvent, dried and installed in the test stand. With no lubrication of the roller bearings, the stand is started and run until one of the roller bearings fails. Method 2: New bearings are operated with oil lubrication for 5 minutes. They are then removed from the test stand, cleaned in a volatile hydrocarbon solvent, dried and replaced in the test stand. The stand is started without lubrication of the roller bearings and run until one of them fails. Operation for longer than 10 minutes requires periodic stops to oil the ball bearings as described in D.

Test Results—Using procedure E (dry operation to failure), the life of these roller bearings was found to be very short, from a few seconds to a few minutes. Some of the results obtained are shown in Table I in which the per- (Please turn to Page 100)

TABLE III
BEHAVIOR OF VARIOUS SEPARATOR MATERIALS UNDER
THE DIFFERENT TEST PROCEDURES

Separator Material	Procedure A Steady Lubr. Run	Procedure B Multiple Starts	Procedure C 5 Delayed Lubr. Starts	Procedure D Baked Oil Operation to Failure	Procedure E2 Dry Operation to Failure
Leaded Yellow Brass Chromium Plate	No Metal Transfer	Very Slight Transfer No Transfer. Wears inner race.	Noticeable Transfer No Transfer. Serious wear on inner race.	3.77 Min. Avg.	3.03 Min. Avg.
Silver Plate	No Metal Transfer	No Metal Transfer	Trace of silver on inner race.	292. Min. Avg. Plate worn off in small areas.	6.17 Min. Avg.
Silver-Lead-Indium Plate	No Metal Transfer	No Metal Transfer. Some wear in pockets.	Slight Metal Transfer	115 Min. Plate worn off in spots.	.....
5-12-3 Lead-Tin- Copper Plate	No Metal Transfer	Very Slight Transfer. Contact areas polished.	No Metal Transfer	81 Min. Much plating worn off in pockets and on lands.	.....
7-3 Tin-Copper Plate	No Metal Transfer	Slight Metal Transfer. Contact areas large but polished.	Slight Metal Transfer	9.4 Min. Heavy metal transfer to races and rolls.	.....

Accurate

By JOHN J. MURPHY

Cincinnati Shaper Co.
Cincinnati

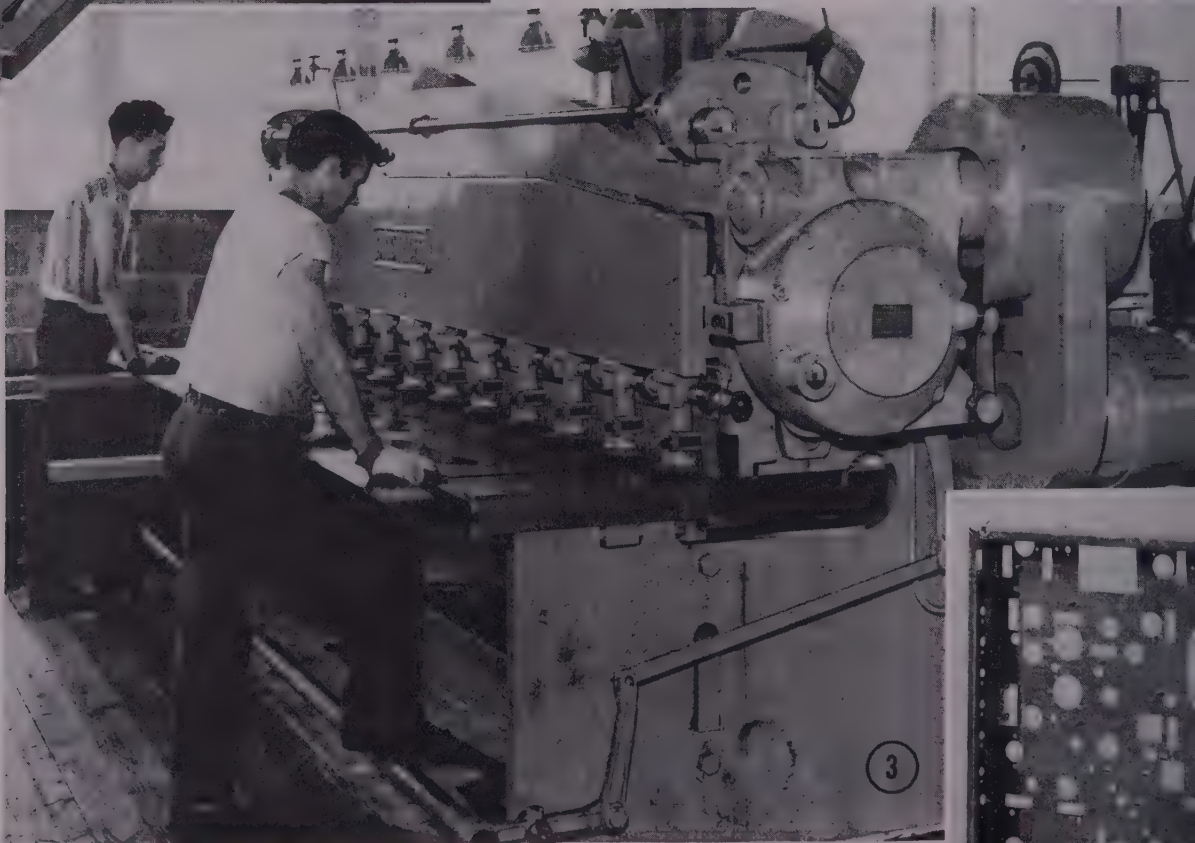
IMPORTANCE of accurate blanks for stamping and forming is seldom appreciated. Forming accuracy is in a large measure dependent upon the quality of the blank used. A modern squaring shear can effect considerable savings in the production of accurate straight sided blanks without the need for costly blanking dies.

With the modern squaring shear, sheets can be sheared to size within plus or minus 0.005-inch or better. Strip can be cut parallel within 0.005-inch in feet of length. Blanks are square and twist in narrow strips is greatly reduced or avoided entirely.

Benefits derived from accurate shearing during stamping

Fig. 1—Precision ball bearing motor-driven back gauge. Dial reads to 1/128-inch and settings can be made to 0.001-inch

Fig. 2—Tilting stops for front gaging lie flat beneath sheet and rise to position for gaging when sheet is removed



Blanks

— WITHOUT DIES

... produced on rugged squaring
shears equipped with precision gaging system

sequent operations are: 1. Economy of material, 2. ease and accuracy of gaging, 3. smooth and speedy assembly, 4. reduction of spoiled parts.

A shear capable of producing "blanks without dies" must first be ruggedly constructed and free from accuracy-robbing deflections. It must have a gaging system capable of maintaining proper alignment and with a construction to withstand the rough treatment usually present during shearing operations. A suitable gage is shown in Fig. 1.

Handling time is shortened and production increased with these fast, quick-setting gages. A power back gage, for example, saves considerable handling time by eliminating the necessity of going to the rear of the machine to set the hand gage. In addition, setting of the gage angle can be made to very close limits. When shearing strips for example, to limits of 6.375-inch plus 0.010-inch, minus 0.000 it is possible to set the gage to say 6.380-inch and then shear without exceeding the specified limits.

Gaging Bars—Most modern shears are equipped with front gaging bars and stops that make for speedy cost-saving operation. Fig. 2 shows a "tilting stop" or hinged stop commonly used for front gaging sheets when shearing strip. By placing a pair of gages in the support arms for the initial trim cut and another pair in the table slots an entire stock sheet can be cut completely into strip in a single handling without the usual process of laying aside the last piece to cut in another operation. The "tilting stop" remains below the level of the table, allowing the sheet to lie flat until the sheet is removed. When the sheet is lifted the stop rises up into position.

The holddown system must be capable of clamping

the material without movement during the shearing operation. Any slippage under the holddowns, no matter how small, will show up in the accuracy of the sheared blank. Fig. 3 illustrates a hydraulically operated holddown whose advantages are: First, the very great pressure which prevents slippage and secondly, its ability to clamp any thickness of metal with a uniform pressure. Lastly, the shear must be fast cutting. A slow speed shear will nullify all cost-savings obtained by the elimination of the blanking dies.

Clutch Control—To speed shearing and increase output an electric clutch control can be installed on most shears. The electric clutch control is usually furnished with two foot switches and a selector for single or double operator control. With double operator control, both operators must depress their foot switches before the clutch will trip and the shear start. This added safety feature increases the output of the shear without danger to the operators. On wide sheets or long sheets when it would normally be necessary to have an assistant trip the conventional clutch lever, it becomes a simple matter to place the remote control foot switch at any position convenient to a single operator.

At F. H. Lawson Co., Cincinnati, such a cost-reducing shearing application is taking place in the manufacture of medicine cabinets, cans, and containers of all types. Shearing the blank for the No. 210 medicine cabinet body starts with a 30 x 74-inch stock sheet. One trim cut and three piece cuts produce three blanks 30 x 24½ inches. Utilizing the back gage, approximately 10,000 blanks are sheared and then stacked.

Blanks are then brought to the front of the shear and two more trim cuts are made,* producing a finished blank 24¼ x 25⅝ inches. Two operators are used and approximately 400 blanks are produced per hour. Tolerance on the blank is plus or minus 0.005-inch. The shear is equipped with an electric clutch control with two foot buttons, one for each operator. The shear will not operate until both operators have tripped their respective foot switches thus eliminating the possibility of injury to the operators. An assistant at the rear of the machine stacks the finished blanks.

Subsequent Operations—Subsequent operations including notching, forming and finishing produce finished cabinet. In these operations too, the importance of starting with an (Please turn to Page 93)

Fig. 3 — Hydraulic holddowns clamp sheet with uniform pressure regardless of thickness

Fig. 4 — Finished television chassis contains 281 holes, notches and tabs. Courtesy Rex Engineering Co.



INGO

By DAN REEBER
Associate Editor, STEEL

Believed to be the first hot-strip mill ever incorporate an oscillating roller type hearth furnace in the line, this interesting new rolling unit has the capacity for processing 720,000 tons of ingots annually

Fig. 1—Battery of five circular ingot heating pits

Fig. 2—View of 54-inch reversing edging mill

Fig. 3—Two-high, 54-inch reversing breakdown mill

Fig. 4—General plan of the hot strip mill

COIL
STORAGE

COILED Hot Strip IN SIX MINUTES

CONTINUOUS flow production of steel from an ingot to a tightly coiled unit of hot strip is now being realized in the recently completed rolling mill plant at Newport Steel Corp., Newport, Ky. This layout, capable of processing 60,000 tons of ingots monthly on a 15 turn-per-week basis, is believed to be the only such mill in existence which rolls from the ingot to a finished coil in approximately 6 minutes without any intermediate reheating or appreciable production delays. Finished strip quality on both carbon and stainless grades is said to be quite high with an above average yield from the ingot being realized. Operators of the mill believe they will achieve greater flexibility with this setup in the production of all the various strip gages.

Housed in a structure 1650 feet long which is composed of two buildings, one 70 feet and the other 96 feet wide, this continuous hot-strip mill consists of the following pieces of equipment: Ingot heating pits, edging mill, breakdown mill, crop shear, holding furnace, finishing mill with two auxiliary hot-reel furnaces, and an upcoiler, all of which are connected by means of roller tables. Beyond the upcoiler a cutting-up and flattening line is being installed for the production of hot-strip steel in sheet sizes.

This current expansion program, involving an expenditure of about \$11 million, also includes the construction of two 60-ton electric furnaces.

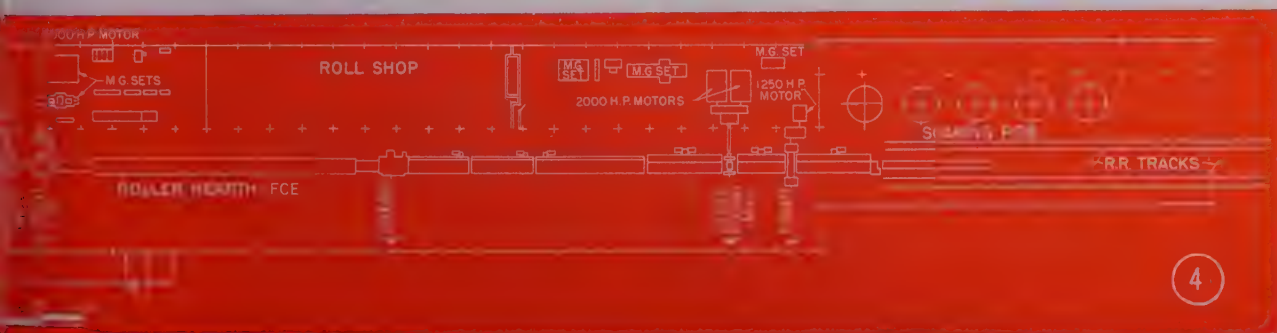
First unit of the continuous line is the battery of five circular ingot heating pits, designed and built by Salem Engineering Co., Salem, O., which are served by an overhead 15-ton cover crane built by Alliance Machine Co., Alliance, O. Pits are of 16-

foot inside diameter and may be fired either by natural gas or oil. In designing the pits, their floor level was placed above the ground level of the mill building so that all burners and equipment could be easily serviced from the mill floor. All pit controls are placed in air conditioned rooms and the stripper crane cab is also air conditioned. Ingots produced in Newport's open-hearth department are placed in these furnaces and in 7 hours brought up to rolling temperature of 2100° F.

Edging Mill Is 54-inch Reversing Unit — After leaving the heating pits ingots move on to the 54-inch reversing edging mill built by Taylor-Wilson Mfg. Co., McKees Rocks, Pa., which uses 36-inch diameter rolls with 25-inch necks moving in Timken tapered roller bearings. This mill is driven by a 1200-hp motor through a single reduction gear drive. Approach and delivery tables for serving the mill were also produced by the mill builder.

A typical ingot 18 x 39 x 72 inches is given nine passes through the edging mill and 15 passes through the following breakdown mill in approximately 3 minutes time to produce a plate 0.625-inch thick. Following the edging mill material moves on to a 54-inch two-high reversing breakdown mill which was revamped by Lake Erie Engineering Co., Buffalo. Utilizing 36 x 66-inch rolls having 23½-inch necks moving in Timken tapered roller bearings, the unit is driven by two 2000-hp motors through a twin reduction gear drive. The mill's approach and delivery tables produced by Taylor-Wilson are each individually motor driven. This unit is able to roll to 0.500-inch, approximately 20 ingots per hour.

Following the breakdown mill are three run-out



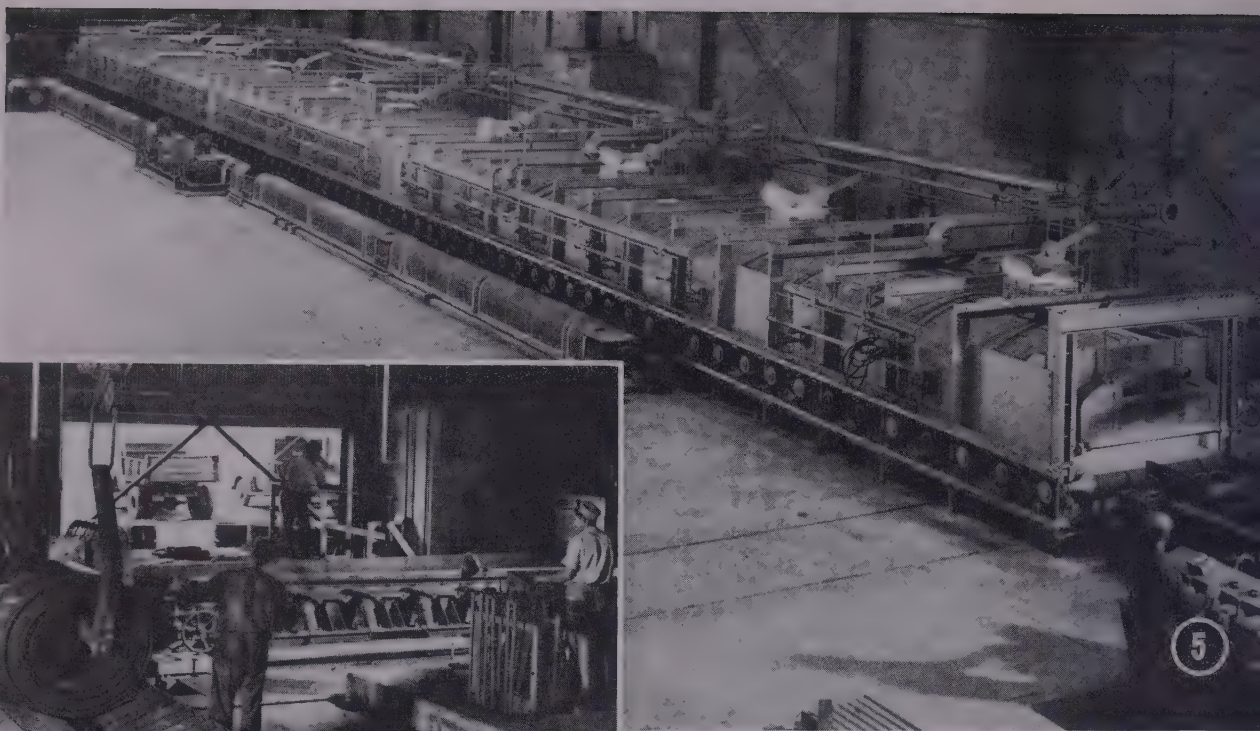


Fig. 5—Oscillating roller-hearth type furnace, 154 feet long, which is located between the breakdown and finishing mills

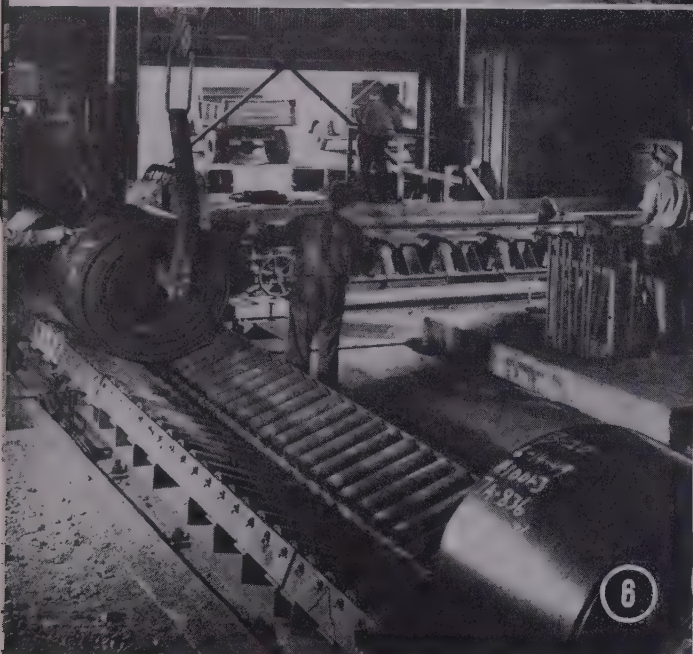


Fig. 6—Mandrel-type tight up-coiler and conveyor for removing finished coils to storage or to the flattener and cut-up line

tables having a combined length of 115 feet which deliver the steel to a 54-inch electrically driven up-cut crop shear designed and built by Lowey Engineering Corp., New York. Located beneath and at 90 degrees to the shear is a 30-inch Link-Belt conveyor for removing crops from beneath the mill entirely underground until they reach the outside of the mill building. On either side of the shear is an idler table 20 feet long.

Material after being cropped is then run into an oscillating roller-hearth type furnace 154 feet long having a hearth 66 inches wide. Temperature of the material as it leaves the breakdown mill is approximately 1750° F. Automatic temperature control enables the furnace to retain this heat in the material for any desired length of time. The plate while in the furnace moves back and forth 6 complete revolutions per minute to keep the material from sagging the rolls.

The furnace may be fired with either gas or oil and in case of an electric power failure a gasoline unit automatically is turned on and keeps the furnace operating. It is said that this is the first time a roller hearth furnace has been used in connection with the operation of a reversing hot-strip mill. Primary objective of the unit is for equalization of temperature on the plate before further reduction to hot strip gages so a more uniform gage lengthwise will be obtained in the finished material.

Reducing Atmosphere Available—Immediately following the holding furnace is located a 54-inch 4-high finishing mill and its two hot up-coilers each located within a furnace. The furnaces were built by L. Erie Engineering who also revamped the mill. The mill proper is driven by one 4000-hp motor through a pinion stand while the coilers are each driven by one 150-hp motor on the main drive and one 75-hp motor on the auxiliary drive. The mill has a maximum speed of 1200 fpm. Reels are of a double-shaft type and are subjected to the furnace temperature to achieve uniform heat throughout the strip. The furnaces are so constructed that reducing atmosphere can be used if desired. They may be either gas or oil fired and have a temperature range of 1200 to 2100° F. Five passes on the mill are used in reducing material from 0.625 to 0.140-inch. No pinion rolls are used between the mill and reel furnaces on either side.

A Worthington high-pressure water and steel descaling system affording 1000 pounds pressure is used on the 2-high and 4-high mills for the scale removal. This equipment is contained in a separate room and comprises pumps, high-pressure boiler, switchboards, valves, piping, compressors, etc.

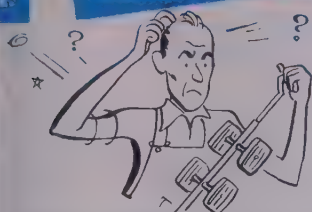
Sheet Size Strip Also Produced—Runout table following the 4-high mill is 200 feet in length and leads directly to the 54-inch mandrel-type tight up-coiler built by Taylor-Wilson. Tables were built by N. York's machinery division at Elkhart, Ind. This unit coils material to an inside diameter of 30 inches.

HOW Full Production WAS REGAINED IN CHROMIUM PLATING

COSTLY PROBLEM:



This manufacturer's production line was really snarled up. Quality of his chromium plate was excellent—what there was of it. But each day his total output was less and less. This bottleneck was assuming serious proportions because the trouble was progressive and all efforts to isolate the cause were to no avail.



VERY MYSTERIOUS. All the operations preceding the chromium bath were in order. Electrical equipment was up to par. Yet, they had to keep decreasing the tank load to get coverage.



HOW TO CURE A "HEADACHE." Of course—United Chromium! This is their "meat." Let's get the U. C. man in here to help us get rolling again.



DIAGNOSING. Despite the fact that chromium plating solutions have high tolerance for impurities, all tests pointed to *contamination* as the culprit. But from what?

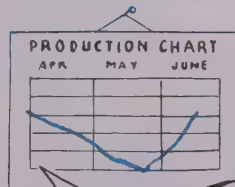


THE "BUG" IN THE BATH! Microscopic examination brought the trouble to light. The *water supply*. It was contaminated by minute water plants. More organic matter was being introduced than the chromium solution could tolerate.

THE PAY-OFF!

A pure water supply ended the trouble. Production began to hit full stride as the chromium bath returned to normal.

Again United Chromium Technical Service shows how it provides security against needless expense and production troubles. Plants operating under this UC agreement recognize it as the fore-sighted way of keeping ahead on chromium plating—technically and financially. Write for our bulletin CR-2 containing details.



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PROCESSES AND MATERIALS

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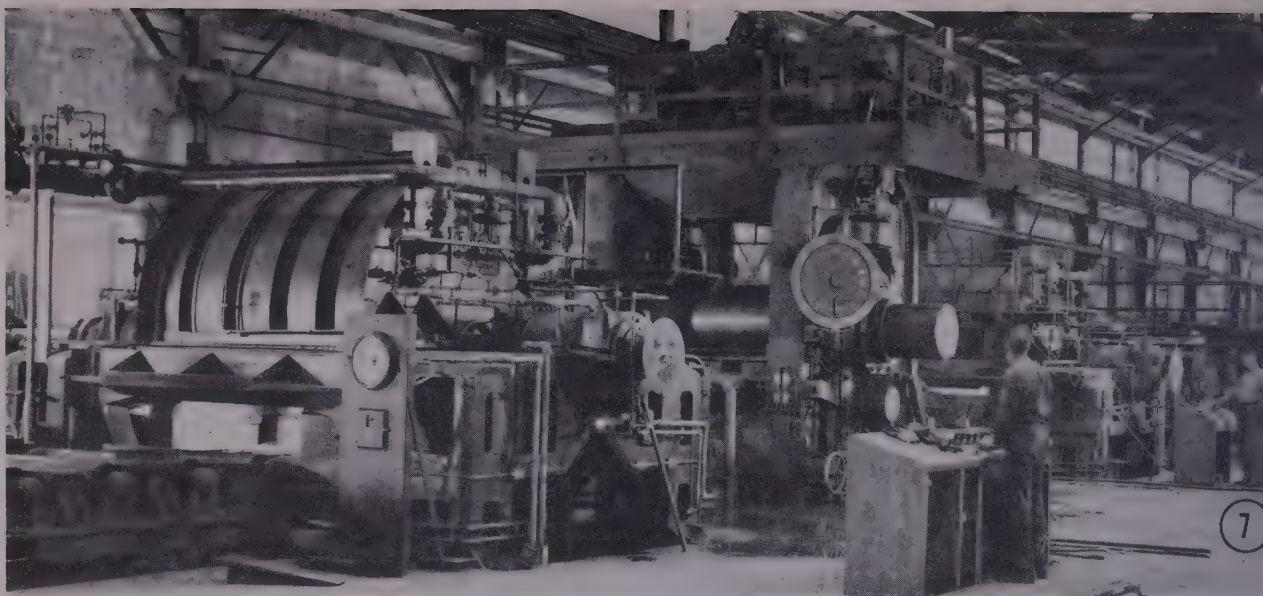


Fig. 7—View of 54-inch, four-high, reversing finishing mill with its two hot up-coilers each located within a heating furnace

The unit picks up the strip on the fly and winds the material into a perfectly tight coil. A Taylor-Wilson conveyor, 40 feet in length, moves the finished coil to a better position for crane removal. Material to be processed into sheet lengths is then sent to a flattener and cut-up line located in the extreme end of the mill building.

Crane equipment installed in the new plant consists of a 15-ton Morgan ingot charging and stripper crane, one Bedford 50-ton mill crane used for roll changes, and three Whiting 15-ton cranes for general use, in addition to the Alliance pit cover crane in operation in the ingot heating department. The water purification system used at the plant was designed and built by the Shreve-Walker Engineering Co., Detroit. Mills, coilers and tables are lubricated by an automatic De Laval system for oil and Trabon

for grease. Motors are lubricated by a Bowser system.

Both motor rooms which contain the main motor generating, auxiliary equipment and switchboards are all ventilated by a forced recirculating air system designed and built by Westinghouse Electric Corp., Pittsburgh. A building 50 x 550 feet contains two motor rooms with a 125-foot long roll shop located between the two units.

The roll shop contains a Lobdell roll grinder, bearing assembly equipment, including a washing unit for conditioning the bearings, conditioning tables, etc. Rolls are brought into the main mill building on an electrically-driven roll car. Both the motor rooms and roll shop are serviced by a crane which is permitted to enter either motor rooms or roll shop by means of electrically-operated doors located high up on the walls.

Welding Terms Booklet, Charts Offered by AWS

Over 500 terms and 57 illustrations are contained in a standard on welding terms and their definitions, offered by American Welding Society, 33 W. 39th St., New 18, N. Y. Defining many basic concepts and providing proper distinction between related concepts, the standard is the result of four years of effort to provide a suitable standard terminology for welding.

Also available from the society is a master chart of welding processes listing all 37 welding processes in commercial use today and process charts comparing these processes on the basis of similarities and differences of 24 fundamental characteristics important in production welding. Copies of standard welding terms

and their definitions are available at \$1.00 each, copies of the master chart at 35 cents per set of five. If purchased together, the price is \$1.25.

Film Details Generation Of Metal Bearing Surfaces

Latest techniques in ultra high-speed, microscopic, photoelastic and Schlieren photography were used in the 16 mm sound motion picture, "A Film Report on the Generation of Metallic Bearing Surfaces," available from Micromatic Hone Corp., Detroit. It is stated that in order to completely describe a metallic bearing surface it is necessary to know four things about it. They are: Surface finish, surface character, surface structure and accuracy. All are explained and illustrated along with ways of producing metallic surfaces.

Shearing of metal is shown by means of ultra high-speed photography in which it can be seen the tool exerts enough pressure to cause the metal at the tip of the tool to pass its ultimate shear strength. Stresses set up in the process are made visible by substituting a piece of plastic for the steel and using polarized light, this being called photoelastic photography. Heat generated by the shearing action is shown by use of Schlieren photography in which a concentrated, extremely bright arc-light is focused on a concave mirror. Part is positioned between the arc and the mirror in the path of the light and the heat waves given off by the metal can be seen photographically in the beam of intense light. Film is available from the company for showing before technical or trade organizations.

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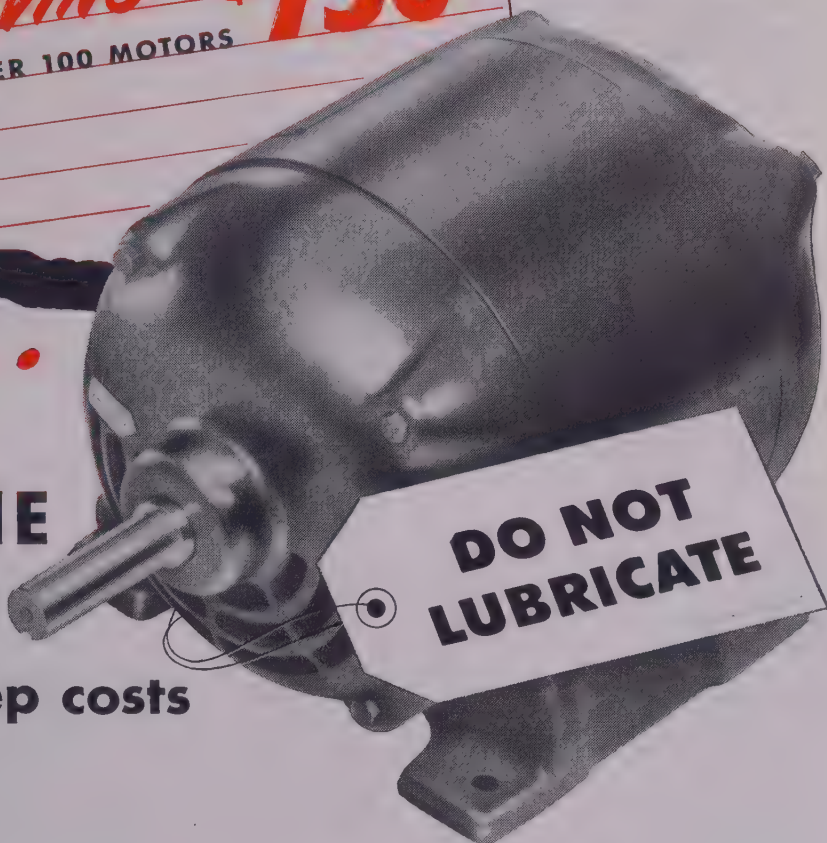
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A recent survey of 114 large motor users—operating 131,626 a-c motors of 1 to 50 hp—shows how much motors really cost when you figure actual "Life Cost".

The survey shows that the yearly average cost of periodically lubricated motors was \$270 for every hundred motors installed.

On lubrication cost alone, Life-Line motors saved this \$270. That's because Life-Line requires no periodic lubrication—no added lubrication of any kind.

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The record of 500,000 Life-Line motors in service, to date, indicates a failure rate averaging less than half that of conventional motors covered by this survey. This means over 50% indicated reduction in motor outage costs—in short, a possible saving of \$480 per year with Life-Line.

Add these savings—\$270 for lubrication plus \$480

for outages—and the result is \$750 per hundred motors per year.

Can you afford to pass up savings like these? Get the facts on the savings possible in your plant. Ask your nearby Westinghouse representative for a copy of B-4321 "How to Cut Motor Costs \$750". Or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania.

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Life-Line

Motors



SILICOSIS is caused by the inhalation of extremely fine free silica dust (SiO_2) although the disease may be modified by other factors. This disease was first observed at the time of the destruction of the Second Temple in Jerusalem by the Romans. About the time Columbus discovered America, a stone cutter's lung was sectioned, and found that the knife felt as though it were cutting through sandpaper. Not much was done in regard to the prevention of this disease until 1915 when special work was carried on by the United States Bureau of Mines and the United States Public Health Service.

Timken's management has been interested in special medical supervision and prevention of silicosis in the electric steel industry. The problem of silicosis in the steel industry is not just a doctor's dream, but an actuali-

HOW TIMKEN Prevents Silicosis

... in employees handling silica brick for electric furnaces

By EDWARD M. FEIMAN

Medical Director
Timken Roller Bearing Co.
Canton, O.

ty. As a result, the company has developed a program which will prevent silicosis in the process of electric steel manufacturing.

The important factors in acquiring silicosis in order of importance, are:

1. Concentration of SiO_2 in the air.
2. Size of the dust particles.
3. Length of exposure which varies according to the severity of the first two causes.

In electric furnace steel manufacturing the only employees exposed to silica dust are the laborers unloading brick from the car and the bricklayers required to handle and scutch brick in the process of construction of the electric furnace, especially the top. The company has for years refrained from using ordinary silica brick which requires scutching from 250 to 300 brick for the construction of the top, some brick requiring the

bricklayer to scutch for 10 to 15 minutes to produce the proper shape and size.

During the process of scutching the bricklayer produces a small cloud of silica dust. This hazardous process has been completely eliminated using prefabricated brick and mortar which are set together, making a top, just as one puts together a saw puzzle.

All brick used are sprayed with oil by passing the brick through an enclosed spraying machine. Silica brick are very porous, and the oil penetrates the surface. This eliminates silica dust in brick handling and construction of the furnace.

In addition to handling and laying silica brick, it is necessary to use an electric saw for cutting brick. A No. 10 exhaust separator is used. This unit thoroughly mixes the exhaust dust-laden air with water, and collects it in a portable tank, thus eliminating dust in the atmosphere and on the floor of the department.

In the past, 60 man hours were required to unload a car of silica brick. In addition, two suction apparatuses operate to eliminate dust in the car while unloading. Over 90 per cent of the handling of the brick and the dust in the car is eliminated by shipping palletized loads of brick.

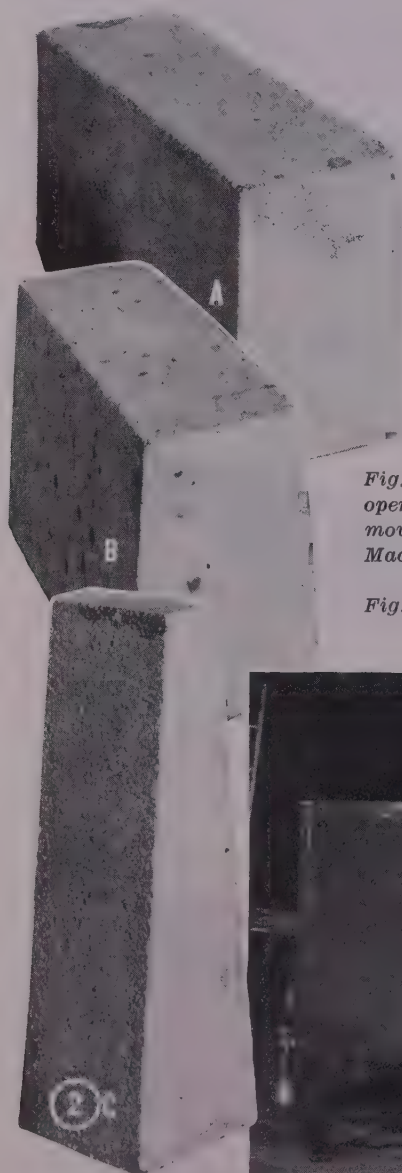
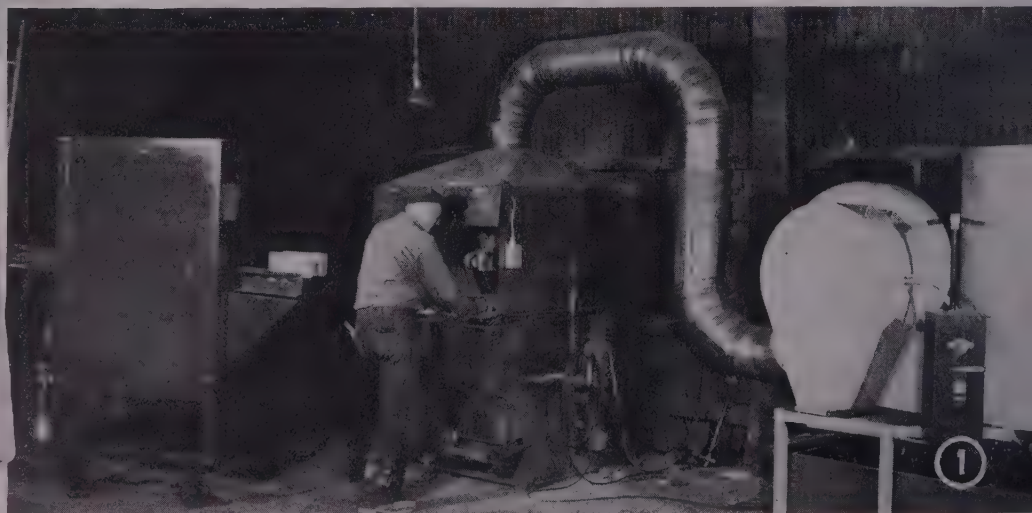


Fig. 1—Dust generated by brick cutting operations, using an electric saw, is removed by water-precipitated dust separator. Machine for spraying brick with oil is shown at operator's left

Fig. 2—(A) Regular silica brick, (B) and (C) prefabricated



THIN STAMPINGS

Deburred Without Bending

UNTIL recently, the tumble deburring of sizable thin soft steel stampings has been a problem at International Business Machine Corp.'s Poughkeepsie, N. Y., plant because such stampings tend to interlock and bend in this operation. Even when deburring proved satisfactory in itself, the cost of straightening bent stampings was prohibitive.

A way of avoiding this trouble, at least in some cases, has been found in "self" tumbling, a process which uses the abrasive action of the pieces rubbing on each other, plus a small amount of fine abrasive. One part, typical of many now tumbled by this method, is a card stacker plate made from soft steel (55 Rockwell) and only 0.032-inch thick. This stamping is about 4 inches wide and 6 inches long and has narrow projecting ears near each corner. These ears are easily bent, but the center is stiffened by a drawn depression.

Tumbling is done in a two-compartment steel barrel (Fig. 1) of 24-

inch diameter lined with Neoprene. Stampings are placed in the barrel by hand in a flat position, their planes being about horizontal and roughly parallel to the axis of rotation. Both compartments are substantially filled, this being important because it prevents the parts from being thrown about and being bent by the weight of others above them or by impacts. There is, however, opportunity for some motion in which burrs on the contours of the stampings are removed.

When about 2000 parts are thus loaded, there are added 16 gallons of water, 5 pounds of No. 3M powdered abrasive, made by Minnesota Mining & Mfg. Co., and 2 pounds of No. 300 mild alkali compound which prevents rusting. When thus charged and caps applied, the barrel is rotated at 7 to 8 rpm for 40 minutes, then being opened and flushed out as shown in Fig. 1.

During the tumbling, parts are found to have shifted to positions at

right angles to the axis of rotation. They apparently have been moving back and forth in the planes they occupy. The load is not dumped, but parts are removed by hand to avoid the bending that dumping might cause. Satisfactory deburring of edges has occurred and, although occasional parts may be found bent, the proportion of these is insignificant.

Self tumbling is also done on smaller parts, especially small steel stampings, using inclined barrels of the type shown in Fig. 2. Such parts are not so easily bent and can be handled in barrels of this type. For these parts, the time averages about 6 hours and a typical charge includes 7500 pieces and 10 pounds of sand which is just moist enough not to raise dust. Five pounds of No. 300 Sturgis compound and 5 gallons of water are added, the tumbling continuing for 5 hours for a total of 11 hours in the successive moist and wet tumbling operations.

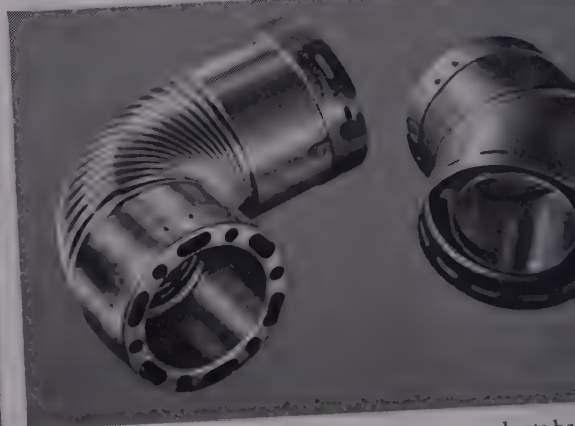
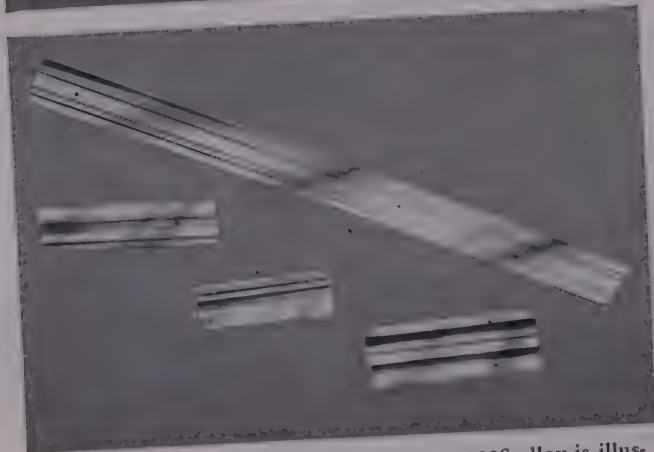
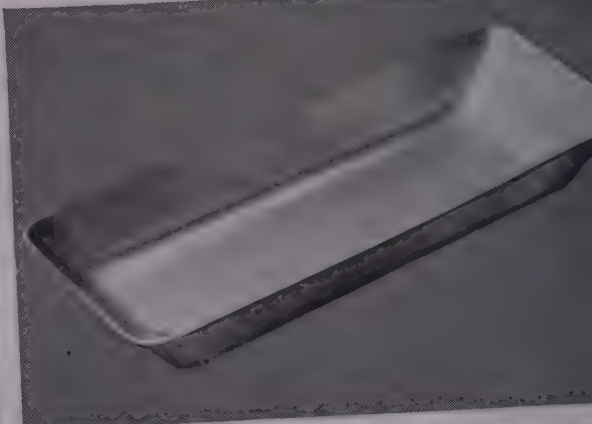
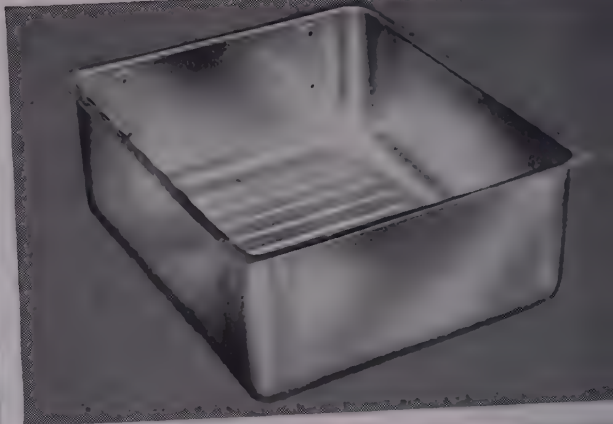
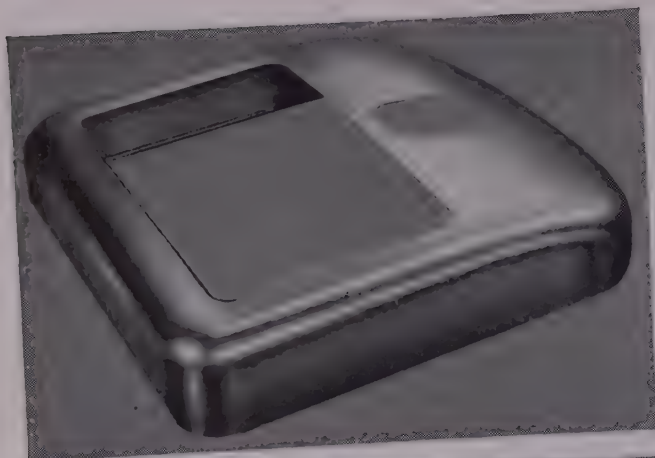


Fig. 1 (left)—After tumbling, thin stampings are removed by hand, flushed clean and the barrel flushed out. Deburring of edges without bending part takes about 40 minutes



Fig. 2 (right)—Smaller stampings which are less likely to become bent during tumbling are processed in inclined barrels of this type

Announcing



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Visual Safety Programs Paying Dividends in

LESS ACCIDENTS, GREATER EFFICIENCY

OF OVER 2 million workers—10 per cent of the nation's industrial workers—now receiving benefits of programs installed by leading manufacturing plants to improve the safety and sight of their employees, one out of every three on an average needed eyesight correction, according to findings of American Optical Co., Southbridge, Mass. An analysis of reports received from these plants, shows that the adoption of recently conceived industrial safety and visual efficiency programs has resulted in reduced eye and other accidents and the saving of many thousands of dollars in medical costs and in compensation costs.

Functioning of these programs, the company states, is based on a plan which provides a speedy check of vision under the supervision of ophthalmologists or optometrists in charge of the programs to determine whether industrial workers need a complete eye examination and cor-

rection for maximum safety and efficiency.

Injuries Cut 80 Per Cent—According to C. F. Burris, safety manager, International Business Machines Corp., Endicott, N. Y., there has been no loss of vision through accidents in that company's plants since putting the program into effect. He stated that the dozens of safety lenses shattered by severe impacts indicate that serious eye injuries were avoided. All injuries, including minor cases, have been found to be approximately 80 per cent lower in the plants of this company.

Experience with the program in the plant of Hughes Tool Co., Houston, shows that 726 employees were fitted with prescription safety goggles. Taking into consideration that six eyes were reasonably sure of being saved by the goggles, this company figured from a strictly dollars and cents standpoint, it would have cost \$12,000 in compensation alone, plus

about \$3000 in medical and hospital expense.

Portable Screening Unit—A comprehensive plan for improving visual conditions in industry was developed several years ago in co-operation with the ophthalmic professions. Primarily the plan provided means for checking industrial vision. As it seemed to be impractical to give millions of factory workers a complete on-the-spot eye examination and refraction, American Optical Co. developed a portable sight-screening instrument which can be utilized anywhere in a plant to check fourteen important visual functions in a few minutes. If the professional evaluation of the check indicates need for visual care, the employees are advised by their companies to seek professional advice and attention so that their vision may be brought to the highest possible level. Other program features include establishment of eye protection standards, program for fitting and maintaining eye protection devices and recommendations for improving environmental conditions affecting vision, such as correct illumination, elimination of glare and other measures for increasing visual perception.

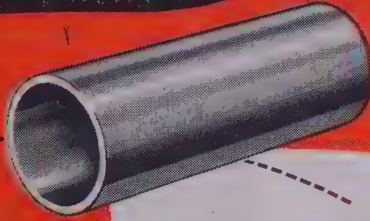
This employee of Union Twist Drill Co., Athol, Mass., has been provided with safety goggles for correction and protection of vision on this eye-hazardous job



Circuit Breaker Rating Tables Approved by ASA

Meeting all the usual needs of circuit breaker users and at the same time giving both manufacturers and users the benefits of standardization, are new tables of preferred ratings for power circuit breakers, recently approved by American Standards Association, New York. The standards developed by a committee of manufacturers, users and engineers interested in power switchgear are designated as American standard preferred schedules for power circuit breakers, C37.6-1949, presenting schedules in four tables of ratings covering circuit breakers of the following types: Indoor oil, indoor oil-less, outdoor oil and outdoor oil-less and low oil content.

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Illustration Courtesy of Harris Products Co., Cleveland, Ohio

Republic



ELECTRUNITE TUBING

By **CHARLES L. McGRANAHAN**
Assistant General Superintendent
Pittsburgh Works
Jones & Laughlin Steel Corp.
Pittsburgh

Production of

HOT and COLD-ROLLED Strip and Sheets

In this eighth and final section the author discusses electrolytic galvanizing lines, formed steel products including corrugated roofing and siding and methods used for the hot-rolling and finishing of stainless and heat-resistant steel sheets and strip

PART VIII

ELECTROPLATING of zinc on narrow strip-steel has been carried on successfully for a considerable number of years but only within recent years has it been applied to strip of sheet widths. Successful application of this process to the coating of wide strip for tin plate revealed the fact that substitution of proper electrodes and electrolyte would make feasible the electroplating of wide strip with zinc in the lighter weight coating. Electroplating lines, patterned after tinning lines have been installed for electrogalvanizing and are depositing zinc in coatings ranging from 0.1 to 0.2 ounces per square foot on strip up to 38 inches in width and at speeds of 160 feet per minute. Such a line is illustrated in Fig. 68 below. It was pointed out earlier that such coatings

are essentially pure zinc and differ from hot-dip coatings in that they contain no layer of zinc-iron alloy. It is apparent that electroplated coatings are therefore quite ductile and can be subjected to severe forming as adherence is of a very high order.

Importance of proper pickling and cleaning of base metal was stressed in the discussion on pickling of sheets and strip for hot-dip galvanizing. This is equally or more important in the electrolytic process that all scale, grease or any foreign material be removed as well as a thorough rinsing be given the strip to eliminate any alkali or soaps used during the cleaning operation. Adhesion of zinc to the base metal is so dependent upon the thoroughness of the preparation of the surface to be plated that its importance cannot be over-estimated.

A considerable tonnage of carbon steel sheets is formed annually into roofing and siding sheets such as corrugated, V-crimp, roll roofing, gutter, eave troughs, down-spouts, etc. The base metal may be either plain or copper-bearing steel, uncoated, painted, galvanized, galvanized and painted or covered with a layer of asphalt impregnated fibrous insulating material.

Galvanized sheets may be furnished with various coating weights depending upon the type of atmospheric exposure to which they will be subjected and to the severity of the forming, however, the galvanizing committee of the American Zinc Institute specifies 2 ounces per square foot for the

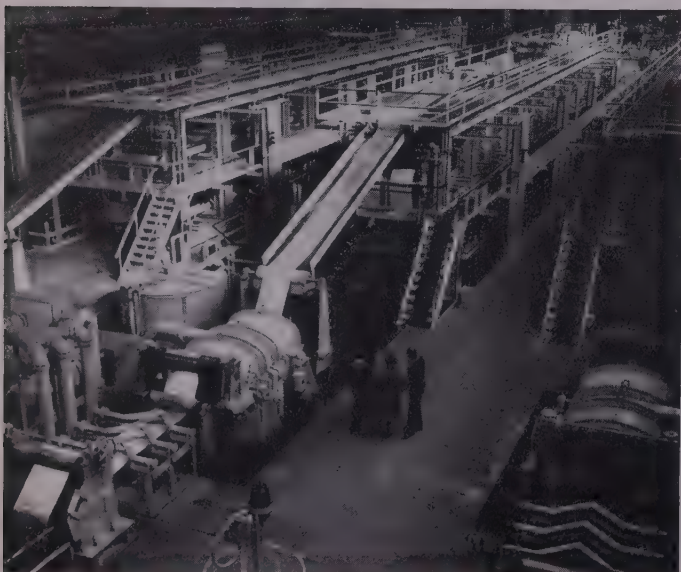
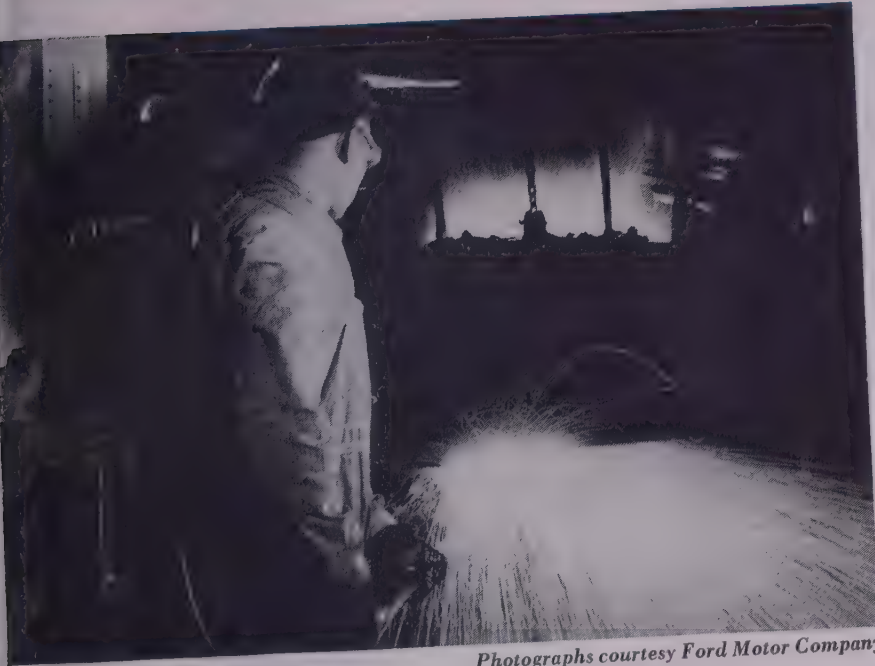


Fig. 68—Modern electroplating lines. Unit on right is devoted to the production of zinc coated strip and sheets while center and left units are plating tin. This model installation is located at the Weirton Steel Co.

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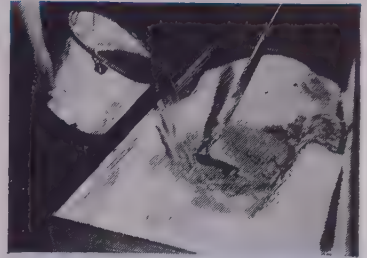
Photographs courtesy Ford Motor Company

A large automobile manufacturing firm found that high temperatures and severe operating conditions were playing havoc with the doors of their 15-ton electric furnaces. Run 16 hours a day, 5 days a week, these furnaces are poured every 2½ hours and are charged twice during each cycle. With a good grade of firebrick, furnace door linings lasted an average of only two or three days before replacements were necessary.

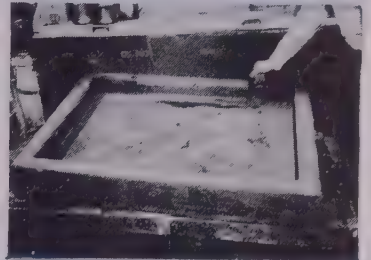
A trial installation of KAOCAST—

the B&W high temperature Refractory Castable—was made. The KAOCAST doors stood up two to three weeks . . . *five to eight times longer than firebrick*. As a result, doors on all electric furnaces of this type are now lined with KAOCAST. *Savings in maintenance are running into thousands of dollars per year.*

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Shell of furnace door, cleaned, ready for installation of KAOCAST.



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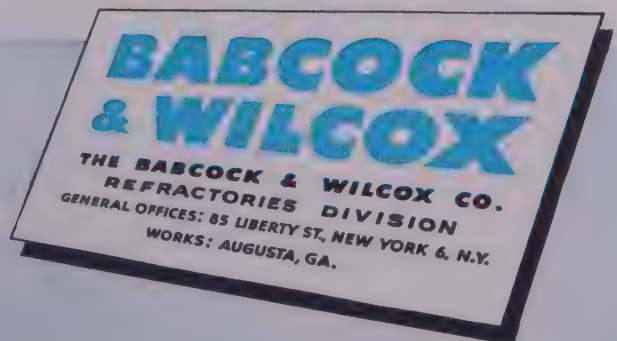


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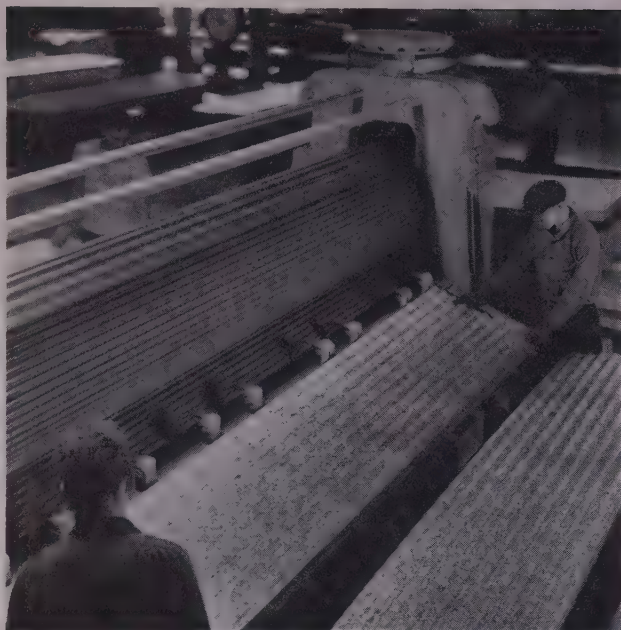


Fig. 69—Roll-type corrugator fitted with dies for forming 1¼ and 2½-inch corrugations. J & L photo

the top head is accomplished by a series of toggle links actuated by compression bars, rather than by eccentrics. The die-heads carry three or four corrugations which necessitates the use of several strokes to completely form a sheet. This machine is well adapted for the forming of side rolls, roof gutters and corner flashing. Bands for use in packaging formed sheets are produced on small machines called band corrugators. These machines produce corrugations on narrow strip which match standard corrugation or V-crimp.

Standard 2.66-inch corrugated sheets usually have 10 corrugations to a sheet of siding and 10½ corrugations to a sheet of roofing for covering 24 inches. Corrugation depth is about ½-inch. With one edge up and one edge down, the width of sheet after corrugating is about 27½ inches. Roofing sheets are formed with one edge up and one edge down to insure 1½ laps when being laid so as to provide an improved seal against leakage. Siding sheets are formed with both edges down and are lapped on corrugation when placed in position.

Standard 1¼-inch corrugated sheets usually have 20½ corrugations to a sheet for covering 24 inches. Corrugation depth is about ¼-inch. With one edge up and one edge down, width of the sheet after corrugation is about 26 inches.

V-crimp is so-called because the side lap is in the form of an inverted "V". There are several different styles designated by the number of V-crimps formed in each sheet. The most commonly used styles are 2, 3 and 5 V-crimp. Covering width in all styles is about 24 inches when lapped; flat sheet widths are 26¼, 26⅞ and 28 inches.

Standard lengths of corrugated roofing and siding and V-crimp roofing are 5, 6, 7, 8, 9, 10, 11 and 12 feet, but special lengths can be secured on order.

Steel sheets which have been coated with asphalt

Fig. 70—Typical finishing department showing abrasive belt sheet grinders for polishing stainless steel sheets. Mattison Machine photo



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HOT and COLD-ROLLED

Strip and Sheets

and asbestos or similar materials are furnished with $1\frac{1}{4}$, $2\frac{1}{2}$ and 3-inch corrugations with a width of about 33 inches for approximately 30-inch coverage.

Formed sheets for roofing and siding usually range from 29 to 18 gage in thickness. Industrial applications are in the range from 22 to 18 gage. Rural installations find the lighter gages quite satisfactory.

Stainless and heat-resisting steel sheets comprise that group of flat-rolled product in widths 24 inches and over, of a thickness 0.176-inch and under. Such steel sheets may be hot-rolled to approximate gage upon a conventional hand sheet-mill followed by a suitable annealing, pickling, skin passing, etc., or they may be produced by cold reducing to gage of a hot-rolled stainless or heat-resistant strip which has been rolled on a continuous hot-strip mill. The two processes differ considerably in details of the reduction to gage, a few common factors being low heat conductivity of the sheet-bar or slab and the necessity for annealing and pickling at certain stages of each process. Once the specified gage has been reached, finishing processes are practically identical.

Equipment for the hand mill production of stainless and heat-resistant steel sheets consists of a conventional sheet and pair furnace, a two-high roughing and a two-high finishing stand of rolls. Such a mill starts with a sheet bar ranging from $\frac{1}{4}$ to 1-inch in thickness and usually 8 inches or over in width. This bar is either shot blasted all over or spot conditioned, depending upon amount of surface defects that must be removed previous to hot rolling. Bars are heated in the pair furnace, the temperature depending upon the analysis being used, and, are reduced by successive heating and rolling to a thickness of about 0.150-inch. These breakdowns are sometimes pickled and spot conditioned at this thickness then reheated and rolled to a gage suitable for finishing, this gage being 15 to 20 per cent heavy to allow for surface improvement by cold reduction. Sheets

heavier than 16 gage (0.062-inch) are finished in singles while sheets 16 gage and lighter are produced from 0.150-inch breakdowns that have been rolled in pairs, matched, doubled and elongated to desired length by alternate heating and rolling. When producing sheets as light as 24 gage (0.025-inch), two packs of double-pairs are used, the finished pack consisting of eight sheets.

After hot rolling, the loose sheets or packs are roughly sheared, opened (individual sheets torn apart) if in packs, then annealed at 1400 to 1500 degrees F if of straight chrome composition and at over 1900 degrees F if of a chrome-nickel grade. This operation is carried out on a roller, walking beam, or chain type normalizing furnace and precautions are taken to maintain an atmosphere which will produce a light tight scale. Such an oxide will be removed uniformly when pickled or descaled thereby producing a surface free of pits or etching which result when scale is loose or flaky. Chrome-nickel grades are susceptible to carbide precipitation between 1500 and 800 degrees F and must be cooled rapidly, quenching being employed on the heavier sheet gages and on plate.

The annealed sheets are now pickled in a bath of about 10 per cent sulphuric acid or sulphuric-muriatic acid followed by a short pickle in nitric-hydrofluoric acid which imparts a white uniform finish to the product. A number of mills are successfully using the sodium-hydride process for descaling stainless steel rather than the acid method. This process is described in the discussion on stainless steels. Descaled sheets are then thoroughly scrubbed and dried after which they are taken to a four-high cold mill and reduced to finished gage by successive passes through the stand.

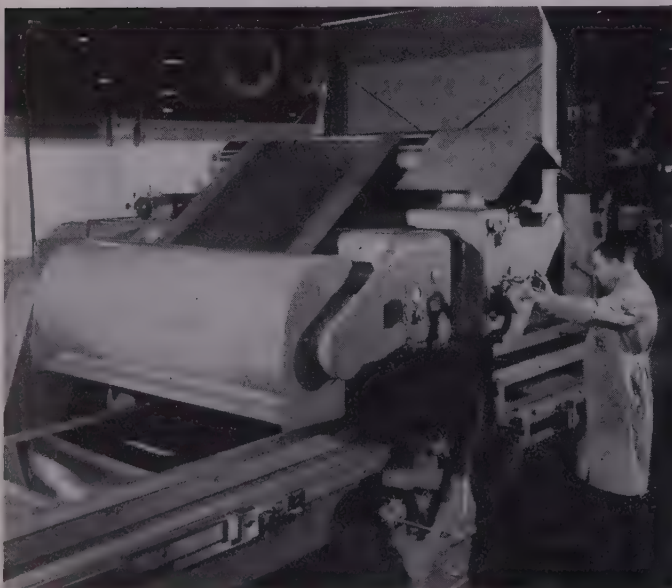
The sheets are then re-annealed, descaled, either by repickling or by the use of the caustic hydride bath, and given a final pass on a two-high cold mill. Amount of cold work on this pass varies according to whether the pass is for an aid in flattening the sheet or for the purpose of improving the finish. Additional operations consist of finish shearing, roll leveling or stretcher leveling, inspection and shipping.

No. 1 hot-rolled annealed and pickled finish is produced when the sheet of ordered thickness is annealed, pickled (or descaled) and flattened by roll leveling or very light cold rolling. No. 2 D full-finish (dull cold-rolled) is produced in a similar manner except that sufficient reduction is taken on the cold mill to materially improve the surface. Use of shot blasted rolls coupled with some cold reduction, imparts a smooth dense finish to the sheet. No. 2 B full-finish (bright cold-rolled) is produced as above except that a polished roll is used in the cold mill.

Chrome-nickel high tensile sheets may be obtained in $\frac{3}{4}$ -hard temper and full-hard temper. These tempers are secured by variations in the annealing and cold reducing practices.

Stainless steel sheets are also produced with a polished surface as follows: No. 4 standard polish is produced by grinding the surface on a machine such as that shown on Fig. 71. Grinding wheels of different coarseness are used, the finishing operation being with not less than 120 grit. No. 6 standard polish tampico-brushed is produced by dulling a No.

Fig. 71—View of sheet grinder during polishing operation. Mattison Machine photo



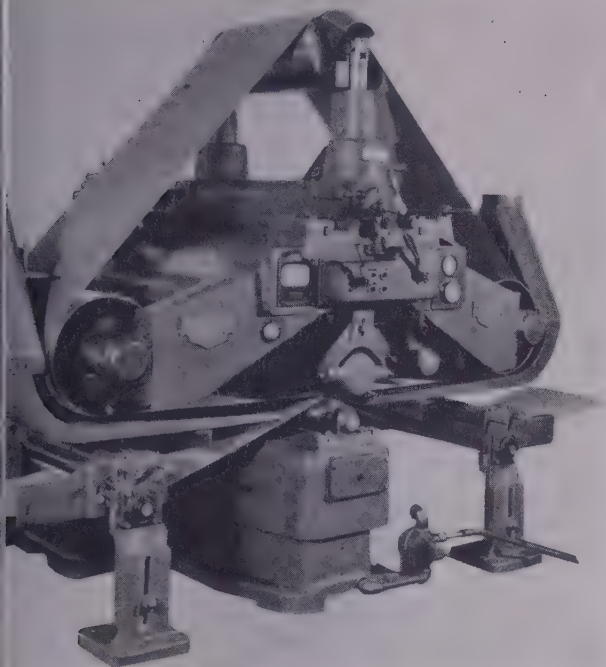


Fig. 72—Abrasive belt polishing head for processing coiled product. Mattison Machine photo

be carefully conditioned before hot rolling and their heat conductivity is such that time in the slab heating furnace is about three times as long as required for carbon steel grades. It is essential that the slabs be subjected to not too high a temperature in the heating furnaces otherwise they will develop a coarse or open surface when rolling and this is difficult to correct. Considerable care must be exercised to see that the section does not come in contact with aprons located between the table rolls or with high stripper guides on mill stands as these grades have a tendency to scratch easily. This is especially true of the iron-chromium alloys which are very soft when hot and are therefore easily gouged or marked. This grade is also very susceptible to grain growth when overheated and is very likely to be torn and cracked when being rolled. It is not possible to give a standard practice for all grades as each type hot-rolls somewhat differently from the previous one, those requiring the most care when being reduced from ingot to slab giving the most trouble when being hot-rolled to strip. Constant care must be exercised at all times to secure a surface, sufficiently good, so that subsequent cold reduction will remove minor defects and produce a finish of the desired quality.

finish with a tampico brush saturated with kerosene and pumice. No. 7 high lustre polish is obtained by buffing a No. 4 finish which may show grinding lines from the first grinding operation. No. 8 mirror finish is the highest grade produced and is obtained by finish grinding with a fine abrasive until all grinding lines are removed, then buffing to a high lustre finish. Finishes No. 4, 6, 7 and 8 are available on one or both sides of the sheet.

Production of polished finishes is not a simple job as considerable heat is developed during the grinding and polishing operations and difficulty is frequently experienced in securing a sheet with a satisfactory flatness. Polished sheets cannot be subjected to stretcher leveling as a final flattening as such a procedure would damage the finish by reason of elongation of the surface.

Production of stainless and heat-resisting steel sheets and strip by continuous or semicontinuous methods does not differ greatly from practices used for carbon steel sheets and strip except that the slabs must

It is customary to anneal and pickle hot-rolled stainless steel strip before cold reducing it to gage as its hardness in the as-rolled state is usually over 100 Rockwell B. Nickel-chromium grades are annealed at about 1950 degrees F while the straight chrome grades utilize a temperature of 1475 degrees F. When box annealing is used for this last grade, a scale breaking pass is given the strip prior to pickling.

The annealing and pickling operations are carried out on continuous multi-stand normalizing and pickling lines. Equipment is similar to that previously described under normalizing furnaces and continuous picklers, the principal difference being that the two units are arranged in tandem and are usually equipped with multiple pay-off and tension reels. There

Fig. 73—Two-roll vertical abrasive belt grinding and polishing machine for processing stock in sheet form. Hill Acme photo





Fig. 74—Cold reducing stands for breaking down and finishing wide stainless steel strip. United Engineering & Foundry photo

HOT and COLD-ROLLED Strip and Sheets

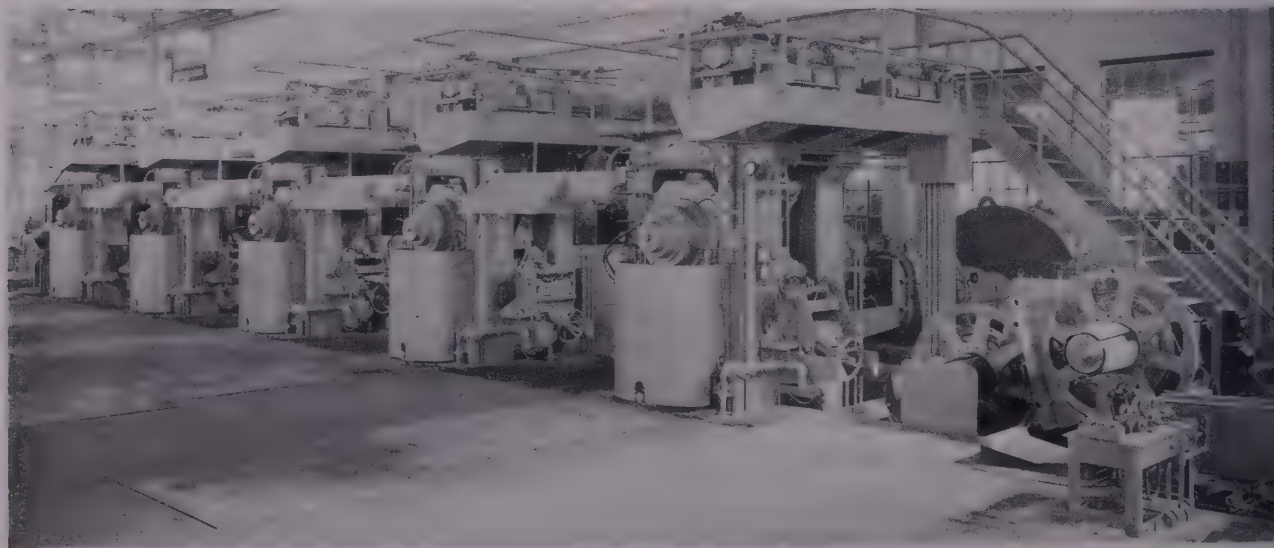
are usually a fewer number of pickling tanks employing a solution of sulphuric or nitric acid to which hydrofluoric acid is sometimes added to promote more rapid pickling.

Cold-reduction of stainless steels differs from that of carbon steel in that an annealing is necessary before cold-reduction operations start and one or more intermediate annealings and picklings are required before the final gage is reached. The cold-reduction is accomplished on a four-high reversing stand as shown in Fig. 74, or upon a tandem mill similar to Fig. 75, except with four rather than five stands of rolls. It is usually possible to take from 50 to 75 per cent cold reduction in the initial stages followed by an annealing and a pickling for each 50 per cent of reduction until final gage is reached.

Fig. 75—View of entry end of 5-stand tandem mill for production of narrow cold-reduced strip. United Engineering & Foundry photo

When these operations are carried out on a reversing mill the processing from hot-rolled strip to finish gage may involve up to five annealings and pickling and four steps of cold-reducing. As many as ten passes may be required to secure a total of 50 per cent reduction. The first stage of cold-reduction is frequently performed on a breakdown mill and the final stages on a finishing mill equipped with overhead reels for holding paper which is threaded between the layers of strip on the main reel. This practice is necessary to prevent scratching of the strip surfaces when coiling and decoiling during the cold-reducing stages. When cold-reducing on a four-stand tandem mill it is possible to go from 0.180 to 0.015 inch on two passes through the train with one intermediate annealing and pickling.

The cold-reduced strip is then annealed and pickled after gage is secured and temper-passed to secure the proper hardness and finish. It may then be coiled



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HOT and COLD-ROLLED

Strip and Sheets

to length if shipped in sheet form or it may be slit to narrow widths and shipped in coils or cut length. Where the product is shipped as a polished sheet the temper passing may be performed in sheets rather than in coils after which the polishing is performed on individual sheets by a machine, such as is shown in Figs. 71 and 73. Certain polishes may be imparted to strip in coil form by equipping a similar polishing head with a tension reel located on either side of it.

Numerous operations involved in the manufacture of strip and sheet products and time required for processing make quality uniformity a matter of paramount importance. It is essential that the product from the strip mill not only does the ultimate job successfully but that the quality be maintained to within close limits on shipment to shipment. Unless this requirement is achieved, serious curtailment to production may occur in the customer's plant.

Importance of suitable raw materials and proper open-hearth practice has been pointed out in the discussion concerning that subject. Correct soaking pit and blooming mill procedures have also been covered. The conditioning of the slab for surface defects is usually the first operation directly under strip mill supervision and is the beginning of a quality control that must be exercised at all points in the processing without deviation from proper standards. These standards are established through the joint co-operation of the operating and metallurgical departments and not infrequently have been learned the hard way, i.e., by heavy rejections in the finishing department or by unsuccessful performance in the fabricating shop.

The slab-heating furnaces are therefore equipped with automatic temperature controls and pyrometers are placed at the first roughing stand, the delay table, the last finishing stand, and at the coilers. These instruments which are under the constant attention of the operators and metallurgical observer, give assurance that a heat of the proper steel specifications, adequately conditioned and rolled to a predetermined gage will respond to further processing under sim-

Fig. 76—Finishing train of a narrow semi-continuous strip mill for production of carbon steel and stainless strip steel. Superior Steel photo

ACKNOWLEDGMENT

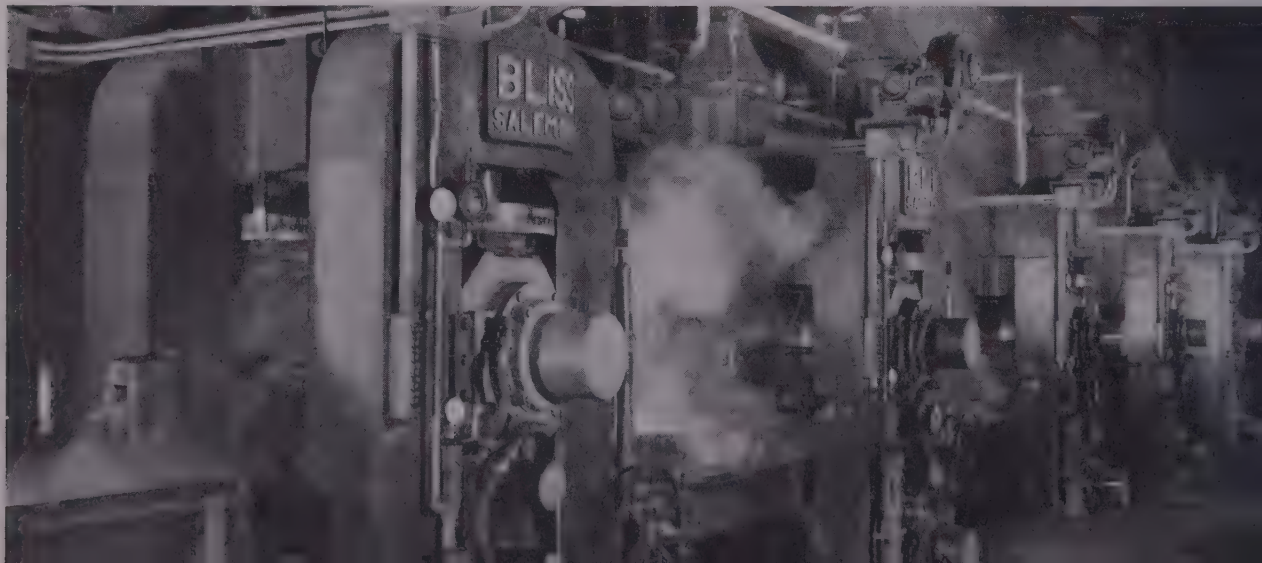
The author wishes to express his thanks to Miss Irene Beres, his personal secretary, for her patience and careful workmanship in correcting and typing his manuscript and also to the various steel companies and equipment manufacturers who have so generously contributed the photographs which accompany this article. He also extends thanks to friends in the industry who assisted in furnishing information not otherwise available.

Liberal use has been made of various articles in the following publications: American Iron & Steel Institute Manuals, Sec. 11—Carbon Steel Sheets, Sec. 12—Hot-Rolled Carbon Steel Strip, Sec. 13—Cold Rolled Carbon Steel Strip, and Sec. 24—Stainless & Heat-resisting Steels. American Iron & Steel Institute Year Book—years 1927, 1930. Association of Iron & Steel Engineers Yearly Proceedings 1932-1934, 1935, 1936 and 1940 and the Modern Strip Mill. STEEL, issues during Oct. and Nov., 1945 and the Making, Shaping and Treating of Steel, published by Carnegie-Illinois Steel Corp., Pittsburgh.

ilar close supervision and will result in a product that will be suitable for the intended purpose.

Similar equipment is installed in pickling and annealing departments and is constantly under the watchful eyes of the operators and supervisors. At no point in the processing is it practical to disregard the evidence which this equipment presents for such practice is bound to result in overpickled steel, hydrogen embrittlement, under or overanneal, annealing stickers, etc.

Ductility and Rockwell hardness tests are performed by a metallurgical tester and surface approval on the inspection bench, determine the suitability of the product for its end use. The processing of the product through the strip mill takes approximately three weeks for a cold-reduced sheet so it is apparent that an appreciable uncertainty at any stage cannot be tolerated. The old axiom that "steel quality is made in the open hearth" still prevails and it is not possible to improve it in the finishing mill, however, it can easily be ruined by slip-shod or uncertain methods and constant vigilance is therefore required.



Accurate Blanks

(Concluded from Page 65)

accurate blank is demonstrated. The final assembly is smooth without the necessity for time-consuming hand fitting. All parts must be interchangeable to insure speedy and economical assembly.

All shearing at the Lawson Co. is held to a tolerance of 0.015-inch and on many parts, they attempt to come within a few thousandths. Witness to this accuracy is the fact that no blanking except for curves and irregular notches is required before press and bending operations.

Control of the shearing is vital. No oversizes in sheets are accepted. In order to economize on material, leftover stock from any shearing operation termed "credits" is returned to the steel stock room. A record is made of the size and the material is held until a part calling for a piece of this dimension is required. In this manner scrap is usually held to as little as 3/16-inch wide trim.

Knife Life—A complete record of knife life is kept on all shears. Average life is approximately 400,000 cuts per edge, or 1½ to 2 million cuts per blade for each regrind. This is exceptional life and is the result of exceptional control. Only 18-gage or lighter sheets are cut on the two Cincinnati shears and knife clearance is held to 0.0015 to 0.002-inch.

Each shear takes approximately 2½ to 3 million cuts per year.

Another good sample of this cost-saving blank production is Rex Engineering Co., Cincinnati. An 1812 Cincinnati shear is used to cut blanks for television chassis on a subcontract basis for a prominent television manufacturer. Again the shearing of straight sided blanks is done in competition with blanking presses with a large savings resulting from the elimination of costly blanking dies.

The blank is 21-7/64 x 24-27/32 inches, 16-gage mild steel. Tolerance on dimension is plus or minus 0.010-inch and production runs to as many as 12,000 per month. Rate of production to produce blanks from stock sheets runs approximately 50 to 100 per hour. Production of television chassis at this plant requires about 60 tons of steel per month.

The finished chassis shown in Fig. 4 contains 281 holes, blanks and tabs. Tolerance on center distance between punches is extremely low and the accuracy of the blanks is important to insure smooth punching, forming operations and assembly.

—o—

An investigation of creep, fracture and bending of lead and lead alloys for cable sheathing—series 1946 is the subject of engineering experiment station bulletin series No. 378, published by the University of Illinois, Urbana.

Alloy Resistance Wire Has High Resistance

Achieving a new high resistance of 1000 ohms per circular mil foot is a new alloy for resistance wire announced by C. O. Jelliff Mfg. Corp., Southport, Conn. Also claimed for the alloy are better workability and an extended range within the temperature coefficient of resistance which remains substantially constant from 20° C to 100° C. This factor does not exceed plus or minus 0.000025.

Other characteristics of the 1000 alloy, as it is called, include high ductility, great tensile strength and easy solderability. A low coefficient of linear expansion is said to insure great dimensional stability of resistor windings. The nonmagnetic alloy is drawn to all standard diameters from 0.0100 to 0.0009-inch and also in small ribbon sizes.

—o—

Around-the-clock winter stripping operations on the Mesabi Range are being speeded by use of the Gradall earth mover, manufactured by Warner & Swasey Co., Cleveland. The all-hydraulic machines are being used to remove that portion of the frozen waste which remains in truck bodies after the truck has been dumped. Its use replaces the conventional hand-operation with a 5-foot blade mounted on the boom.



GAS HARDENING

Hay Baler Knives

HAY balers produced at the Auburn Works of International Harvester Co. incorporate a fixed knife called a ledger plate, blanked from SAE 1078 steel, 5/16-inch thick. The curved cutting edge of this plate has to be hardened to 55-60 Rockwell C for a depth of ⅜-inch from the edge, while the remainder of the plate must remain soft.

To accomplish the hardening of the edge, the plate is set into the fixture, illustrated with its edge parallel to a curved row of nine Selas burners. These are fed with a compressed mixture of natural gas and air supplied from a nearby rotary compressor-mixer unit, having suitable safety and metering controls.

Combustion of the gas-air mixture heats the cutting edge to the required depth, while the remainder of the blade remains relatively cool because it is in contact with plates that are kept cool by water flowing through jackets provided for this purpose. About 45 seconds are required to raise the edge of the plate to quenching temperature, after which the plate is removed with tongs and is dropped into an oil quench. Later, the blades are drawn to the hardness limits mentioned above. With this setup and suitable allowance for the time required in loading, unloading and handling, about 60 blades an hour may be heated in this fixture.

Cold Shaping Steel

(Continued from Page 60)

worked section is reduced in more than one operation, the tensile and yield strengths become slightly higher and the reduction of area and elongation somewhat lower, due to the fact that between operations full strain hardening can develop. This will not occur if the operations are performed immediately following each

Preliminary calculations must be made to determine the shape of the successive operations which will deliver the required physical properties. These calculations can be limited to the determination of various cross sectional areas necessary to produce the required items in the fewest operations within the limits of the cold working methods used. The cross section is calculated for each operation and from that the outer and inner diameters are determined.

Characteristic sequence of operations usually used in cold shaping of shells is shown in Fig. 1.

After the preliminary calculations which determine the variation in cross section from one stress to the next, exact calculations are made. They are based on the fact that the volume of plastic deformation can be

considered constant. These calculations start with the final piece by dividing it into various simple shapes for which the formulas may be found in engineering handbooks.

Dimensional Tolerances — Dimensional tolerances of the required item should be considered on making the die for the final shape. All outside dimensions should be chosen on the minus side and every inside dimension on the plus side, so that the male and female dies allow the full range of the tolerance for wearing. Therefore, the calculation of the final piece must be based on the maximum volume corresponding to worn out die rings and punches. The tolerances in the billet diameter must be considered when determining the blank diameter. These variations of tolerance must be considered when designing the piece in order to use the minimum volume of metal in a billet. The die tryout time is dependent on the accuracy of the preliminary calculations establishing the proper sequence of operations.

Layout of the sequence of operations is very important and is used to obtain the breaking dimension in tolerance for the die design. All considered operations should be laid out in their proper sequence. The

combining of new operations should be made from this elementary sequence out of operation sequence giving consideration to physicals, tolerances and any machine trimming required on the final piece.

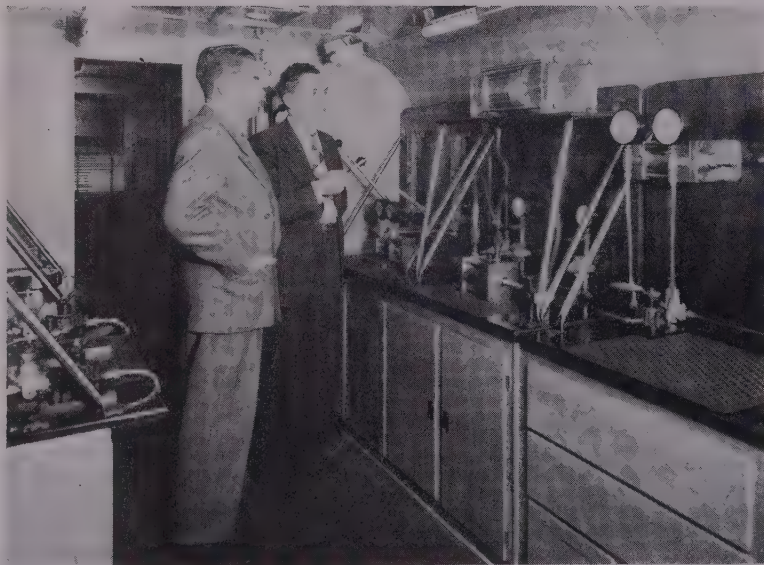
Die Design—In general, dies for cold shaping steel must be designed to withstand high starting pressures caused by plastic deformation of steel stock, impact, fatigue and friction between the work and surfaces. Working stresses in dies are a complex combination of tension, compression and shear. The face of the dies must be finished to a high degree in order to reduce working friction and to prevent pickup due to the extreme pressures used in cold shaping. These factors must be given proper consideration in design and tool building.

A wide variety of die steels have been used for cold shaping dies ranging from plain high carbon steel to high speed steels and tungsten carbide. For die parts, such as extrusion bushings, ring forgings are far the best due to circumferential fibrous structure which enables them to withstand high radial stresses. However, the forging of rings is limited to bushings with a bore not more than 2½ inches in diameter and length not more than 3 to 4 inches. If a heavy amount of machining is done on the die steel, the stress relieving anneal should be performed before the final machining.

Heat treating must be done with care because of the high working stresses in the die. Parts such as bushings should be bore-quenched in order to create compressive stresses in the bore of the die ring. Grinding is also very important. Profile wheels and grinding procedure must be used in order to avoid surface cracks which will be evidenced when the part is stressed in use.

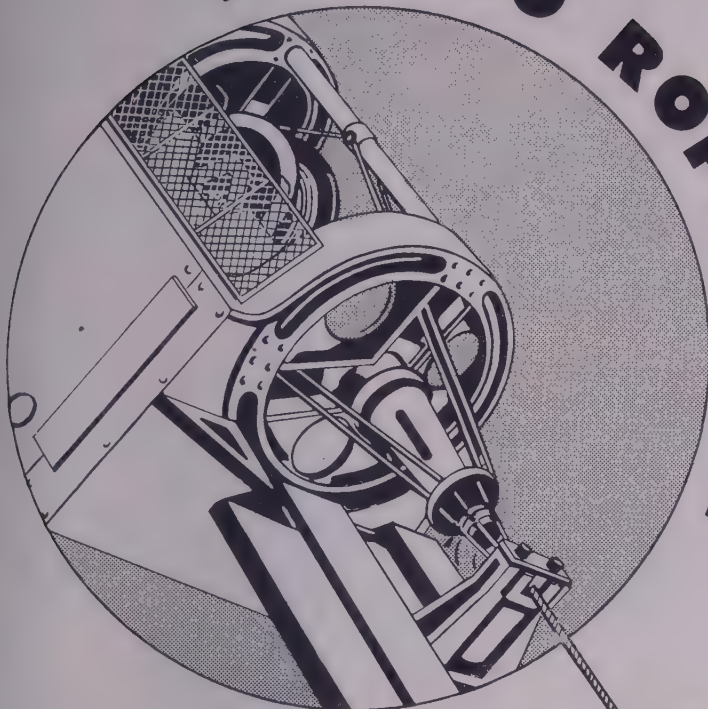
Proper hardness on the surface of the die is most important because it determines the life of the die and the resistance to pickup. It should be at least 61 Rockwell C. Slipperiness is governed to some extent by the carbon and alloy content of the die steel. Both of these properties could be improved by nitriding the die surfaces, but the core beneath the case must be at least 59 Rockwell C, and in the case of backward extrusion punches, the hardness should be 61 Rockwell C minimum. Stress relieving after polishing and a further stress relieving anneal after the die has produced several hundred parts, followed by a further polishing, is said to increase greatly the life of the highly stressed dies.

High-carbon, high-chromium steels



ROLLING "COLLEGE": The front 18 feet of this 33-foot long house trailer are devoted to an exhibit of power cylinders in actual operation. Put on the road by Miller Motor Co., Chicago, this "College of Cylinder Knowledge", as it is called, has an educational purpose of showing how cylinder breakage, leakage and damage to seals and other parts can be eliminated, thereby eliminating downtime, repairs, maintenance and replacements, the company states. Containing bedroom, shower, toilet, refrigerator, cooking stove, thermostatically controlled air circulation and heating furnace, the trailer has a specially designed hitch with two Miller hydraulic cylinders to eliminate side sway, thus allowing it to be pulled by an ordinary passenger car

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have been used for extrusion die rings with small bores, for extrusion punches and for pilots. Plain carbon and carbon vanadium steels have been used for larger punches and die rings.

Preload Rings—Die rings especially extrusion bushings must be preloaded. This can be done by means of heating or cooling one of the parts to be put together before assembly. Replaceable parts such as die rings are usually given a 1-degree taper and are preloaded by pressing the die ring into the shrink ring assembly against this taper. The amount of internal compressive strain is checked by measuring the reduction in diameter before and after pressing the bushing in place. The approximate amount that the bushing opens during an extrusion operation can be checked by measuring the diameter of the extruded part and comparing it with the bushing diameter before extruding. The elastic springback of the extruded part is neglected.

Cupping, drawing, necking, coining and heading dies are not discussed because the design of these tools has become common practice. This section deals only with extrusion dies.

First consideration in the design of tools for the various cold shaping processes is to make all parts which contact the steel stock as small as possible so that parts may be replaced economically. Setup for forward extrusion is shown in Fig. 3.

The cup nest in the bushing should have a diameter D_o of about 0.004-0.010-inch larger than the cup diameter and a length H_o about $\frac{1}{4}$ to $\frac{3}{4}$ -inch longer so as to provide space for centering the punch in the die. The die half angle is normally 63 degrees,

but for heavy reductions with thin-walled parts the angle may be reduced to 45 degrees, which decreases the nonuniform stresses but increases friction in the die. The radius in the

corner should be about $r = \frac{D - D_1}{2}$ ap-

proximately, where D is outer diameter of cup and D_1 is diameter of the nozzle. The radius between the shoulder and the nozzle should be about 1/32 to 3/32-inch, except when the material left on the extrusion shoulder is to be drawn into the next operation, in which case it may be larger.

Width of the land at the nozzle is $\frac{1}{8}$ to $\frac{3}{8}$ -inch, followed below by a relief diameter D_2 about 1/32-inch larger. At the bottom of the die there is usually provided a guide ring, function of which is to keep the extrusion straight. Its diameter is about 0.003 to 0.010-inch larger than the nozzle diameter.

Rounded Radii — Radii between diameters must be rounded and polished to prevent scratching of extruded part as it passes through these rings. Outer diameter of the bushing at the top shall be large enough so that the wall thickness shall be between $\frac{5}{8}$ and 1 inch thick, the thinner dimension being for bushings whose inner diameter of nest is up to 1.5-inch and the heavier wall for larger diameters. It has been shown that thinner walls give better life to bushings than do thick walls.

Outside diameter of the bushing has a 1-degree taper for press fitting and the shrink-ring assembly. This taper leads into a cylindrical part

at the bottom which is used to up the bushing in the supporting block. The bushing rests on a supporting block which in turn rests on a series of packing plates designed to distribute the forming load over the bed of the press. Holes provided in these plates to clear knockout pins. Space is provided the supporting block for a guide sleeve or bushing for additional guiding of a long extrusion. This guide bushing sometimes replaces the guide ring in the extrusion bushing, thereby shortening the extrusion bushing.

In no case should the height of bushing below the extrusion shoulder be less than the thickness of the wall at that point. The die bushing is pressed into the inner shrink-ring which is in turn shrunk into the outer shrink-ring. Hardness of the bushing is about 61-62 Rockwell C and the inner shrink-ring 50-52 Rockwell C and the outer shrink-ring should have a tensile strength of 120,000-130,000 psi. The thickness of the inner shrink-ring is about 1 to 2 times the wall thickness of the extrusion and the outer shrink-ring about 2½ to 4 times the thickness of the die ring. The whole lower arrangement is held down by means of a retainer plate bolted to the shoe.

Extrusion Punch—Extrusion punch consists of two parts: Top plate and shank. Top plate is the part that wears. Its height is about one-half of its diameter and it clears the bushing by about 0.002 to 0.010-inch. The shoulder which applies the pressure may be normal to the length of the punch or some angle up to 45 degrees, the latter being used if a collar at the top of the extrusion is to be drawn in a following operation. The pilot pin or mandrel has the same shape as the cup but clears it by 0.008 to 0.016-inch. Since the mandrel is tapered, a small, straight cylindrical part is provided at the bottom for checking the concentricity of the extruded shell.

The top plate, shank and mandrel are held together to the upper shoe by a long screw which is screwed into a fixed nut on the punch shank. It is important to have this screw as long as possible because it is used to preload the mandrel so that it will not pull away from the top plate. The top plate and shank require high compressive strength and are hardened to 61-62 Rockwell C. The pilot pin is also subjected to high friction forces and it too is brought to a hardness of about 61-62 Rockwell C for abrasion resistance.

A setup for long extrusion with small diameter and a thick wall



TRAINING SCHOOL: A training program, designed to increase use of resistance welding and to assure more productive use of spot, projection, flash, seam and gun welders is being put in operation by Progressive Welder Co., Detroit, for users of these welding methods. These laboratory and classroom facilities will be used in the instruction of those attending the school



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shown in Fig. 5. The lower die is in principle the same as described, except that the guide bushing in the support blocks is made longer, and in extreme cases long enough to serve as a guide for a knockout pin. The shrink-ring assembly is made considerably heavier. The extrusion punch in this case is a sleeve which is held to the ring by means of a tapered section at its top and with a counter-bored hole through which it retains the pallet. Dies for extruding parts with a very thin wall with a small diameter are similar to the ones described above except that the punch and pilot are one piece and the extrusion shoulder is made to a 45-degree bevel.

General arrangement for extrusion backward is similar to that for extrusion forward for the thick-walled parts. A bushing for extrusion backward is shown in Fig. 4. The die ring is stepped, the upper diameter D_n serves as a guide for the punch retainer and is somewhat larger than D_m , the diameter of the blank nest. Length of the guide section is L_g and is about $\frac{1}{4}$ to $\frac{1}{2}$ -inch longer than the punch so that the punch is guided before it contacts the work. Diameter D_n should be about 0.002 to 0.003-inch larger than the billet diameter and the length of this section is about $\frac{1}{8}$ to $\frac{1}{4}$ -inch longer than the extruded cup. The shoulder

between D_n and D_k , the guide for the knockout pin is beveled to 30 degrees with a radius in the corner of about $\frac{1}{16}$ to $\frac{1}{8}$ -inch to reduce the stress concentration at this point. Top of this knockout pin is usually flat, but if the bottom of the cup is comparatively thin, it is rounded slightly so as to make the radial flow of steel easier.

The punch is fixed in a sleeve which serves as a guide for the punch. The working surface of this punch has a slight crown or taper to ease the radial flow of steel. Radius of the crown on the punch is about twice the diameter of the punch, and the angle of a tapered punch ranges from 3 to 5 degrees with a blending radius at the center equal to the diameter of the punch. The radius at the outer corner of a punch is about $\frac{1}{2}$ to $\frac{1}{8}$ -inch, the smaller being better because large radii tend to form a wedge section similar to the bell mouth condition in a bushing. Often the punch is relieved about 0.01 to 0.04-inch from a point $\frac{1}{16}$ to $\frac{3}{16}$ -inch back from the nose of the punch so as to reduce friction on the punch.

The combination of one or more operations on one press can improve the economics of cold shaping in many cases. The general rule is to build each operation as a self-contained unit and then mount these units in a rigid shoe so that the

whole assembly will serve as one unit.

(To be concluded)

Engine Line Expanded

Equipped with five main bearings and counterbalanced crank shaft for smooth and vibrationless operation are the three new JX4 series of 4-cylinder high speed, heavy duty gas-line engines developed by Hercules Motors Corp., Canton, O. Developed for general purpose power application, the engines have a Tocco hardened crankshaft which permits use of bearing metals of relatively hard and long service qualities. The engines have bore and stroke specifications as follows: $3\frac{1}{2} \times 4\frac{1}{4}$ inches, 164 cu in. displacement; $3\frac{3}{4} \times 1\frac{1}{4}$ inch, 188 cu in. displacement; $4 \times 4\frac{1}{4}$ inches, 214 cu. in. displacement.

Wire Cloth Kits Offered

Two sample kits of industrial wire cloth and metal filter cloth are being offered by Michigan Wire Cloth Co., Detroit 16, Mich., to users of those products. One kit contains samples of square mesh wire cloth from 10 to 120 mesh, in such materials as Monel, brass, aluminum and copper. The filter cloth book has samples from 40 to 700 mesh, in nickel, Monel, brass, Chromel and stainless steel. A number of weaves are shown.

Aluminum-to-Steel Bonding Process

Used in Power Tube Radiator Construction

AN aluminum-to-steel molecular bonding process developed during the war is used in the manufacture of a cooling radiator for the large power tubes used in radio broadcasting. The lightweight radiators, which weigh only one-half as much as the one currently in use, were developed by engineers of the Lamp Division of Westinghouse Electric Corp., who collaborated the Al-Fin Division of Fairchild Engine & Airplane Corp., New York.

Previous radiator designs utilizing aluminum for cooling fins failed because soldering of aluminum directly to the copper anode proved impractical because of the fast oxidizing rate of aluminum. This difficulty was overcome by using a hollow steel core that surrounds, and is soldered directly to the copper anode. To this core

a thick layer, or muff, of aluminum is cast and integrally bonded to the steel by the process. The 140 vertical aluminum radiator fins are brazed to this muff. The aluminum-to-steel chemical bond is said to offer no measurable resistance to the transfer of heat from the tube anode to the fins.

Successful use of the aluminum cooling fins in aircooled aircraft engines suggested the possibility of using them in the power tube radiators. Combined weight of a 25,000-w transmitting tube and its newly designed aluminum radiator is 98 pounds in comparison with 225 pounds for the old style radiator plus tube. A smaller aluminum radiator for a 10,000-w tube was found to cut the combined weight from 44 to 18 pounds.

New Problem—The power tube radiator posed a new problem for

the bonding technique. In air-plane engine cylinders a thin layer, or muff, of aluminum is bonded around a thick steel cylinder liner and the pure aluminum of low yield strength, but high ductility, conforms to the steel of high tensile strength without breaking the bond. On the other hand, the tube radiator involves a thick muff of aluminum and a thin steel core, and the difference in the expansion rates of the two metals in normal service might cause failure of the aluminum-to-steel bond, even though its tensile strength ranges from 11,000 to 17,000 psi. It was therefore necessary to develop a new technique whereby the aluminum muff, bonded to the steel liner, is cooled in such a way as to preload the steel in compression so that the bond can withstand the severe thermal cycles experienced in normal use.

Life of the new radiator, which is $15\frac{1}{2}$ inches high and $13\frac{1}{2}$ inches in diameter is said to be indefinite. When the tube fails, the radiator can be unsoldered from the tube and used again.

Silver Surfacing

(Concluded from Page 63)

formance of bearings with brass separators is compared with the performance of bearings with silver-plated separators. Fig. 1 shows the appearance of a brass separator bearing after failure and before removal from the bearing housing. The broken separator is clearly visible. The same bearing is shown in Fig. 2 after removal from the test machine.

When new bearings are tested without previous operation, the life when run dry and without lubrication averages only 0.6-minute. Silver plating the separator appears to afford no improvement under these conditions. When the bearings have been running with oil lubrication for 5 minutes before being tested dry, their life is considerably greater; and bearings with brass separators average 3 minutes running before failure while bearings with silver-plated separators show improved performance and operate an average of 6 minutes before failure. The improvement caused by running-in the bearings in the presence of oil is probably due to the removal of high spots on the sliding surfaces under conditions which will not cause gross seizure, thus permitting longer operation dry.

A more practical test is that of procedure D (baked oil operation to failure), in which instead of removing the lubricant by solvent cleaning it is removed by heating the bearings until almost all the oil vaporizes and only a slight varnish-like film is left behind on the bearing parts. Under these conditions the results shown in Table II were obtained. Bearings with brass separators average 3.8

minutes before failure as compared with 3.0 minutes when they are solvent cleaned. However, bearings with silver-plated separators operate an average of 292 minutes before failure. Fig. 3 shows the appearance of the bearings with a silver-plated separator which failed after 6 hours and 49 minutes. The other bearing which had not failed at this time is shown in Fig. 4. One is well nigh forced to the conclusion that the burned remains of the lubricant film have some residual lubricating ability; and with this minimum of lubrication the silver-surfaced separator performs some 77 times as well as the brass surface.

Brass vs Silver-Plated—These repetitive tests on brass versus silver-plated separators were made on these materials because brass is the material in normal use and because silver plate was found to be superior to a number of other electroplated surfaces which were tested. Some promising tests are under way on separators made of base materials other than brass. These tests are incomplete and cannot be reported at this time. A number of electroplated compositions have been compared using several of the testing procedures, and Table III summarizes the results which have been obtained. The plates compared are chromium, silver-lead-indium, lead-tin-copper, and tin-copper. All platings were an estimated 0.001-inch thick.

Chromium plate was found to be too hard, with the result that it wore the steel surfaces with which it came in contact. At the same time, some spalling of the chromium plate occurred. The silver-lead-indium plate formed numerous tiny bubbles on the

surface after the high-temperature runs. The brass base material was found to be still tinned beneath the bubbles.

The lead-tin-copper plate and tin-copper plate also tended to form bubbles on the surface beneath which the brass was still tinned. In addition, large portions of the surface showed evidence of mobility during the high-temperature runs and some evidence of throwing plated material off the separator against the outer race during testing under procedure D. The tin-copper plate appeared to be considerably inferior to the other although it was somewhat better than brass.

With no one of the separator materials tested was any difficulty experienced in continuous operation under lubricated conditions (procedure A). In view of the low viscosity of the oil (10 centistokes at 100° F.) this is very satisfactory behavior. The slight amounts of metal transfer found during the multiple starting tests (procedure B), except in the case of the chromium and silver plating indicate as might be expected that lubrication is more difficult during the acceleration and deceleration periods and that the hydrodynamic forces tending to build a separating oil film are small.

Perhaps the most interesting aspect of these tests, even more than the discovery of better separator surface materials, is the remarkable ability of these precision roller bearings to operate under adverse conditions. In one test a pair of these bearings was operated for over 30 minutes with only the oil remaining on them from a previous run as the lubricant. When a silver-surfaced separator is used we have the remarkable circumstance of bearings capable of operating several hours without lubrication before failure occurs.

Why the silver surface is superior is a question for much speculation. It is known that molten silver will not wet steel, and this fact may be a factor in minimizing to a large degree the transfer of silver to the mating steel surfaces. If transfer and welding cannot take place, seizure of the bearing pair and hence of the bearing becomes very unlikely. Another factor which doubtless is important is the hardness of the separator surface. The very hard chromium surface did not transfer to the steel, but it was so hard that it wore the steel surface rapidly. The presence of softer, low-melting weldable lead and tin in the other plates tested probably accounts for their relatively much poorer performance.



ACREAGE UNDER COVER: About 1000 tons of structural steel are being erected by Bethlehem Pacific Coast Steel Corp., San Francisco, for the new pavilion of Oregon State College, Corvallis, Ore. Erection of one of the rigid steel frame arches is underway in the picture

New Products and Equipment

Test Head

Wider application and utility for a metals comparator made by General Electric Co., Schenectady 5, N. Y., comes from a new comparator test head for use on flat surfaces, particularly of large equipment. By comparing ferrous or nonferrous metal parts with a known standard, the comparator provides a quick, non-



destructive test of the quality of the parts. Close control on such characteristics as composition, heat treatment or hardness may be maintained.

New test head is designed for use on such large specimens as forgings, machine tool beds and other parts which cannot be inserted in the test coil. Contact face of the new head consists of a ring separated from a concentric core by an air gap, thereby forming a radial magnetic path across which the test piece is placed. Three inches long, it can be supplied in various face diameters, depending upon the application.

Check No. 1 on Reply Card for more Details

Automatic Ladle

A development in removing molten aluminum from melting furnaces to die casting machine is automatic ladling, announced by Lindberg Engineering Co., 2444 W. Hubbard St., Chicago 12, Ill. Discharge side of the furnace is sealed over with a metal plate, through which extends a refractory tube. By means of a hollow graphite block and a graphite tube mounted on the furnace cover, the discharge chamber is connected to the injection sleeve just ahead of the piston.

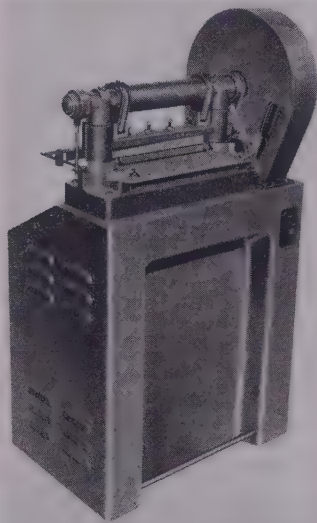
Also extending through the cover is a pressure line connected to a nitrogen tank, the line having a pressure control and solenoid valve. By means of a timer synchronized with the die casting machine con-

trols, the valve is opened to admit approximately 1 pound of pressure to the surface of the molten metal. Control of length of time pressure is applied, the amount of pressure, and the diameter of the graphite pipe controls the quantity of molten metal forced into the machine.

Check No. 2 on Reply Card for more Details

Power Shear

Maximum shearing width of 12 and 24 inches and a maximum capacity in sheet steel of 16 gage is claimed for the Di-Acro power shears announced by O'Neil-Irwin Mfg. Co., Lake City, Minn. Accurate and rapid cut and square, rectangular or other straight sided blanks may be made, narrow strips may be sheared and edges of sheets or parts



may be trimmed. A clean cut free from rough edges is made in all materials.

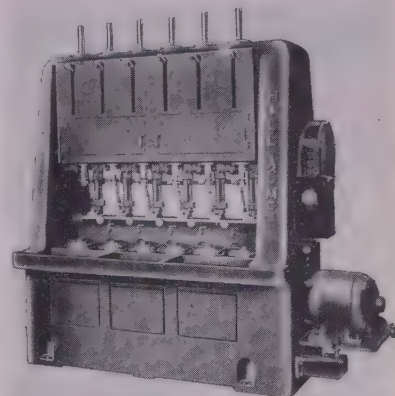
A protracting gage for squaring and mitering can be accurately adjusted for any degree of angularity. Numerous tapped holes are provided for universally locating this gage in any desired position on the shear table. Shear is operated by a nonrepeating positive action clutch, controlled by the operator's choice of either foot bar or hand lever. Operation is by a $\frac{1}{2}$ or $\frac{1}{2}$ hp 120 or 220 v single phase electric motor.

Check No. 3 on Reply Card for more Details

Tapping Machine

Scroll-type, self-centering, air-operated chucks are controlled by valves, automatically operated by the vertical movement of the spindles on the model XC-W tapping machine

built by Hill Acme Co., 4535 St. Clair Ave., Cleveland 14, O. Chucks are designed for three-point contact and receive removable inserts to cover a certain size range of couplings. In the cycle of operation the coupling is placed in the chuck and the hand lever, controlling air valve action, is depressed, causing the chuck to close the coupling. Upon



completion of the tapping operation, the continued downward movement of the spindle automatically engages the lifting cam mechanism which returns the spindle to its upper position with the tap couplings on the shank of the tap.

When the tap shanks become filled with tapped couplings and the spindles idle in their upper positions, the taps are removed from sockets and unloaded into chutes located between spindles. Quick acting ring sockets permit tap removal from sockets while spindles are rotating. Machine is equipped with a large capacity, self-draining chip pans located above the coolant reservoir. Tapping machines are built in sizes of 1 and 2 inches in 6 and 8-spindle models. Larger sizes are built in 4 and 6 spindle design. The same type of machine is adaptable as a semi-automatic nut tapper.

Check No. 4 on Reply Card for more Details

Cam Profiler

Featuring rotary master, variable ratios and automatic cycling, the contour mill No. CM-12, made by George Gorton Machine Co., Racine, Wis., profiles or grooves either the inside or outside periphery as well as the top of cams or cam-like shapes. It is a tracer-controlled swivel head milling machine which employs rotary tables and operates at reduction ratios of 2:1 to 10:1. It will profile all conventional cam shapes which do not include negative angles.

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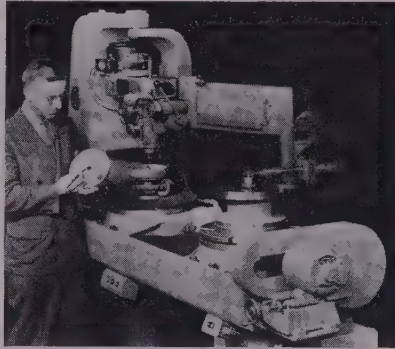
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PITTSBURGH, PA.

LS-3

Two 16-inch roller bearing rotary tables are mounted on the bed of the machine and are geared together and powered by an infinitely variable speed unit. During each cycle, all operations are completely automatic. Spindle speeds from 300 to 10,000 rpm are available, this wide range of speeds permitting use of high-speed steel or carbide cutters or burrs and grit grinding wheels upon occasion. Work piece diameters at various re-

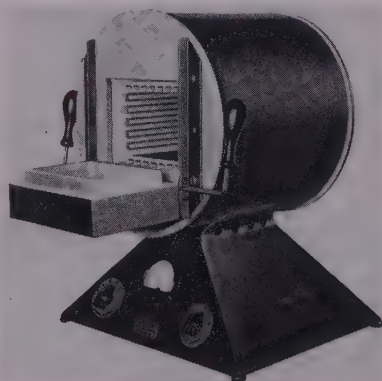


duction ratios vary from 8 inches at a 2:1 ratio to 1.6 inches at a 10:1 ratio. Although the master copy table is 16 inches in diameter, it will easily accommodate larger diameter master cams with the resulting increase in the maximum diameter of the work piece.

Check No. 5 on Reply Card for more Details

Muffle Furnace

Designed for general laboratory requirements such as drying of precipitates, ash determinations, fusion, ignitions, heating metals and alloys, heat treating and general experimen-



tal work is the muffle furnace announced by Hevi Duty Electric Co., Milwaukee 1, Wis. Furnace is housed in a cylindrical shell mounted on a pyramidal type base with practically line contact between them. This allows free air circulation and eliminates trapped heat in the base.

Improvements incorporated in the furnace include instruments and controls at approximately room temper-

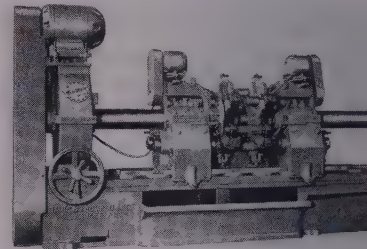
ature, improved insulation design which cuts radiation loss, 36 steps control through a tap-changing transformer, recessed control position for full protection and easy accessibility of instruments through removable panels.

Check No. 6 on Reply Card for more Details

Centering Machines

Continuous rough and finish milling and centering of work pieces simultaneously on both ends is possible with the type MAC milling and centering machine announced by Davis & Thompson Co., 6411 Burnham St., Milwaukee 14, Wis. Work piece size determines the number of stations in the rotary drum type fixture. Work pieces varying in length from 12 to 45 inches can be accommodated on a machine with a standard length bed. When station fixtures are used, work pieces up to 4 inches in diameter can be taken. At a cutting speed of 100 inches per minute a production of 100 pieces per hour can be attained.

During the machine cycle, each station of the fixture picks up the



centering heads and while they are being carried upward the centering spindles are fed into the work by stationary cams to produce a center of predetermined depth. Centering heads are returned to their low position by gravity. Fixtures are of the automatic centering type using right and left hand screw with taper V-jaws. Automatic clamping is adaptable where smaller parts are run.

Check No. 7 on Reply Card for more Details

Boring Bar

Consisting of only two parts, the bar and a bit, rigidly assembled for use by a simple taper fit, the new boring tool announced by Rockford Precision Tool Co., 924 King St., Rockford, Ill., may be used on slotters, shapers, engine lathes, turret lathes, jig borers or screw machines. The ground taper bit seats firmly into a lapped taper hole in the bar. Made of heat treated alloy steel, the taper bit boring bars will not pull back or turn after once seated in the bar. Taper bits always extend ahead

STANDARDS and SPECIALS by the Millions

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2159 SCRANTON ROAD • • • CLEVELAND 13, OHIO



"SHINYHEADS"

America's Best Looking Cap Screw
Made of high carbon steel — AISI C-1038 — to standards for Full Finished hexagon head cap screws — bright finish. Heads machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Tensile strength 95,000-110,000 p.s.i. Carried in stock.



"HI-CARBS"

Heat Treated Black Satin Finish
Made of high carbon steel — AISI C-1038. Furnished with black satin finish due to double heat treatment. Hexagon heads die made, not machined. Points machine turned; flat and chamfered. Tensile strength 130,000-160,000 p.s.i. Carried in stock.



"LO-CARBS"

Made of AISI C-1018 steel — bright finish. For use where heat treatment is not required and where ordinary hexagon heads are satisfactory. Hexagon heads die made to size — not machined. Points machine turned. Tensile strength 75,000-95,000 p.s.i. Carried in stock.

SET SCREWS

Square head and headless — cup point. Case hardened. Expertly made by the pioneers in producing Cup Point Set Screws by the cold upset process. Cup points machine turned. Carried in stock.

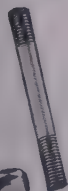


FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

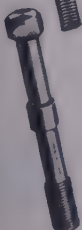


"SHINYLAND" STUDS

All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered machined point. Nut end, oval point. Land between threads shiny, bright, mirror finish. Carried in stock.

ADJUSTING SCREWS

Valve tappet adjusting screws — Hexagon head style — to blue print specifications — hexagon head hard; polished if specified — threads soft to close tolerance — points machine turned; flat and chamfered.



CONNECTING ROD BOLTS

Made of alloy steel — heat treated — threads rolled or cut — finished to extremely close thread and body tolerances — body ground where specified. Expertly made by the pioneers in producing connecting rod bolts by the cold upset process.

SPRING BOLTS

Case hardened to proper depth and ground to close tolerances. Thread end annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.



FERRY PATENTED ACORN NUTS

For ornamental purposes. Steel insert — steel covered. Finish: plain, zinc plated, cadmium plated. Size: 9/16", 3/4", 15/16" across the flats.

Tapped 1/4" to 3/4" inclusive. Cross section of Ferry patented acorn nut, showing how steel hexagon nut fits snugly into shell.



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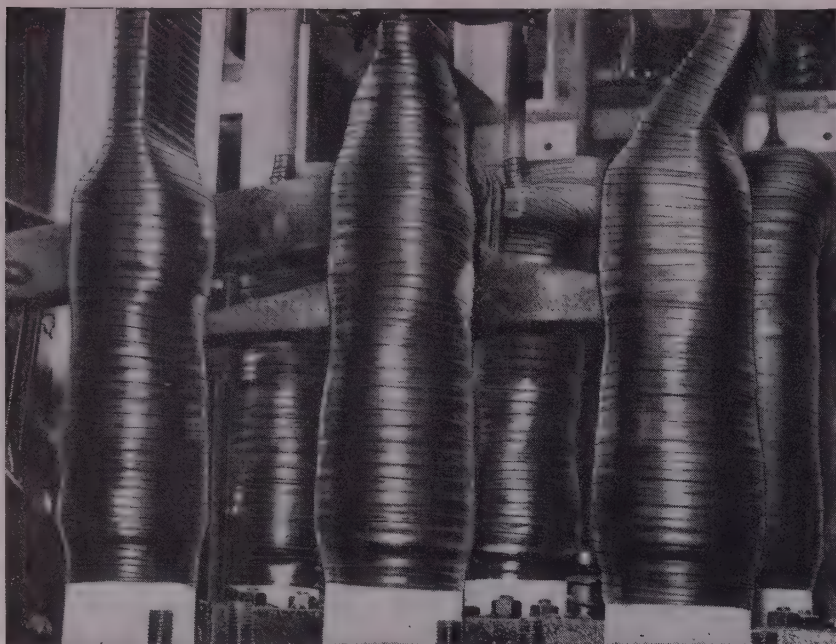
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FREQUENCY CHANGERS at Ohio works of the Carnegie-Illinois Steel Corporation. From 600 to 800 feet of bus is used to connect, tap on and handle the high voltage to and from the frequency changer.

Single plastic tape insulates high voltage bus at Carnegie-Illinois steel plant

Plastic backed "SCOTCH" No. 33 Electrical Tape is a real stopper of trouble from oil, water, acids, and alkalis. It is ideal for wrapping and insulating bus structures of the type shown above. This remarkable new plastic tape also gives long time protection against weathering. On top of all these advantages it is much easier and quicker to apply than conventional materials. Write Department ST-7 for free sample.

Quick Facts About "SCOTCH" No. 33 Electrical Tape

- **THIN CALIPER** — only .007 in. thick, takes less room in junction boxes and other tight spots.
- **HIGH DIELECTRIC STRENGTH** — over 7,000 volts.
- **WEATHER RESISTANT** — withstands sunlight, weathering and corrosive vapors — the worst enemies of rubber and varnish.
- **STRENGTH** — this tape has a tensile strength of 40 pounds per inch of width.
- **STRETCHY** — conforms snugly to uneven surfaces, odd shapes. Elongation at break, 125%.
- **P.S.** — for High-Heat Insulation use "SCOTCH" Electrical Tape No. 27 with Glass Cloth Backing — Thermo-Setting Adhesive.



Made in U. S. A. by **M INNESOTA M INING & M FG. CO.** ST. PAUL 6, MINNESOTA

Also makers of other "SCOTCH" Pressure-Sensitive Tapes, "UNDERSEAL," "SCOTCHLITE," "3M" Abrasives, "3M" Adhesives.

General Export: DUREX ABRASIVES CORP., New Rochelle, N. Y.
In Canada: CANADIAN DUREX ABRASIVES LTD., Brantford, Ontario

of the bar making possible grooving or boring on a shoulder or face. Use may be with high speed steel or solid carbide bits.

Check No. 8 on Reply Card for more Details

Telescopic Truck

Tiering of 48 x 48-inch pallet 115 inches from the floor is possible from six floor aisles with the model 6-48 telescopic straddle type high lift truck made by Revolver Co. North Bergen, N. J. Trucks have

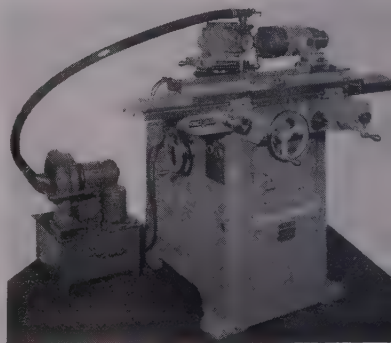


capacity of 2500 pounds, collapse height of 68 and 83 inches and lift of 85 and 115 inches. Also available is the non-telescopic type with 83-inch high fixed mast and 64-inch fork lift.

Check No. 9 on Reply Card for more Details

Grinding Attachment

A thin stream of coolant directed onto the wheel is transformed into a fine mist by a new attachment for No. 2 cutter and tool grinders, announced by Cincinnati Milling Machine Co., Cincinnati 9, O. Instead



of throwing it off on the machine operator and work after hitting the rapidly rotating wheel, the coolant is immediately returned by means of a suction tube through the coolant tank.

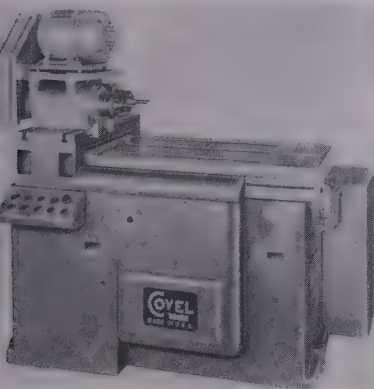
Mist type coolant system for carbide grinding consists primarily of a

floor unit composed of a coolant tank, pump and suction fan, a large diameter flexible return tube and a small diameter supply tube to the grinding wheel, and a guard which completely surrounds all but the face of the wheel. Attachment offers the advantages of both wet and dry grinding. Since the only connection with the machine is the coolant guard, it can be easily applied to any Cincinnati No. 2 cutter and tool grinder.

Check No. 10 on Reply Card for more Details

Boring Machine

Controls permitting instant selection of any one of three automatic cycles and "inching" control for setting up are incorporated in the precision boring machines introduced by Covel Mfg. Co., Benton Harbor, Mich. The electrohydraulic controls



offer quicker response to table and tooling movements and the machine will perform boring, turning and facing operations.

All pushbutton stations are grouped in one inclined panel for easier reach and vision of operator. Cartidge type spindles have permanently lubricated, preloaded bearings. Ways are provided with automatic lubrication. Machines are offered in several models of both single and double end types. The No. 51 single end model is illustrated.

Check No. 11 on Reply Card for more Details

Mesh Counter

Instant and accurate determination of the number of plastic or wire strands per inch in all types of screen material is possible with the Micro-Lite screen mesh counter introduced by Micro-Lite Co. Inc., 44 W. 18th St., New York 11, N. Y. Device consists of multiple layers of transparent plastic, surrounded by a brass or gold-plated metal frame. Instrument is 6½ inches long and its width varies from 2¼ to 1¾ inches. On the field a series of precise, con-

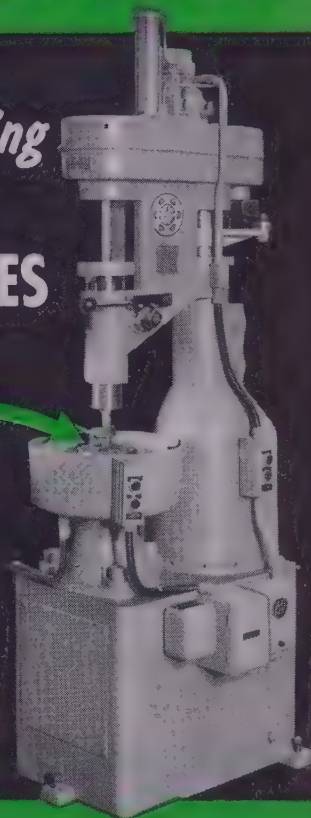


MICROFLAT

for
productively generating
flatness on
RECESSED SURFACES



FINISH
(Bearing, Sealing)
surface to
optical flatness



- Microflat machines may be equipped to finish recessed surfaces.

The location of a surface does not limit the application of the MICROFLAT machines. Any surface that can be machined can be finished with this equipment. The surface finish and flatness generated can be controlled and held to any specified requirement.

The machine shown above is equipped with a timer and an air cylinder. The operator loads the part into the fixture and starts the cycle. The fixture rotates, the bonded abrasive finishing surface oscillates and rotates. At the end of a predetermined time cycle the spindle automatically withdraws. Production is 300 pieces per hour.

MICROMATIC HONE CORPORATION

3100 SCHOOLCRAFT AVENUE, DETROIT 4, MICHIGAN



1322 S. Santa Fe
Los Angeles 21
California

616 Empire Bldg.
206 S. Main St.
Rockford, Ill.

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verging lines are engraved, and along the sides are calibrations showing the number of lines per inch and lines per centimeter.

When the counter is placed on a screen, the inscribed lines on the device produce a lens-sharpened, intense moire pattern against the body of the underlying screen. Where the lines converge, the exact count of the screen is read on this scale. Counter is calibrated from 40 to 150 lines per inch. By multiplying or dividing by two, readings may be obtained up to 300 or as low as 20.

Check No. 12 on Reply Card for more Details

Pillow Block

A means of compensating for both parallel and angular misalignment is incorporated in a prelubricated sleeve bearing made by Bushings Inc., Coolidge Highway at 14 Mile Rd., Royal Oak, Mich. This feature reduces transmission of noise and provides for shock absorption. An Oilite bearing, enclosed in a bushing or shell of Neoprene, the latter being contained in a base of stamped, welded steel, is incorporated in the Silent-Lign unit.

Time required for installation on

new equipment is reduced because of automatic compensation for misalignment. While lubrication need be added at infrequent intervals according to the use, the lubricant in the Oilite bearing can be renewed as required by applying a few drops of oil to the bushing itself. Pillow blocks are available in the popular shaft sizes beginning at 1/4-inch diameter. Special sizes are available.

Check No. 13 on Reply Card for more Details

Portable Air Grinder

Featuring light weight to lessen fatigue in heavy duty grinding and polishing operations, the air powered portable 8-inch grinder announced by



Aro Equipment Corp., Bryan, O., weighs only 14 pounds. Designed with high-strength magnesium castings, the grinder speed is governor-controlled, whether idling or under heavy load.

Features include built-in oil reservoir for air lubrication, flush fittings for grease lubrication, removable air strainer, full ball bearing mounting and construction hardened and ground alloy steel. Grinders are offered in spade and straight handle models, in 6 and 8 inch sizes, with selected range speeds including 4200, 4500 and 6000 rpm.

Check No. 14 on Reply Card for more Details

Standby Power Plants

Generators which are large in proportion to rated engine horsepower and which will start single phase alternating current motors are incorporated in the 1, 2 and 4-cylinder air-cooled engine standby power plants made by Kato Engineering Co., Mankato, Minn. Unit can be installed in freezing atmospheres and are equipped with high tension magnetos, permitting easy hand cranking.

Generators are built for 720, 900 and 1200 rpm in capacities ranging from 5000 w to 200 kw at 60 cycle. They are available in frequencies ranging from 25 to 400 cycles. Optional equipment with the unit includes electrical cranking, automatic voltage regulators and natural gas carburetors.

Check No. 15 on Reply Card for more Details

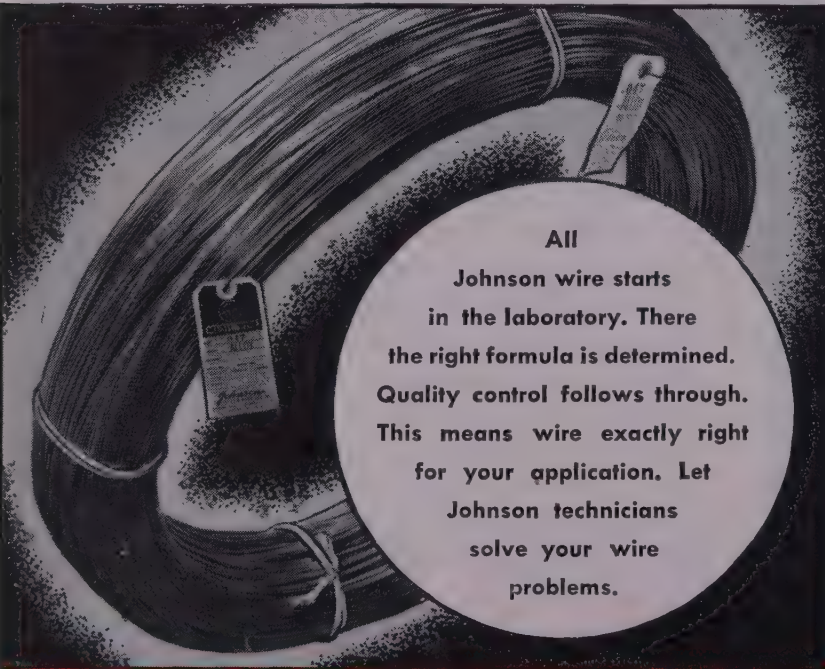
Etcher Attachment

A hand pad for use with E-Mark etchers for electrolytically etching on metal, trademark, part numbers, names, etc., is being made available



able by Crown Industrial Products Co. 1315 W. 69th St., Chicago 3, Ill. A wide variety of information can be typed, written or drawn on the stencil for subsequent application on parts made of steel, brass, copper alloy, magnesium, zinc, bronze, or other metals.

Operation consists of connecting the piece to be marked to the machine, either by attaching the lead with the clip or placing the piece on the metal plate connected to the machine. Hand pad is placed on the



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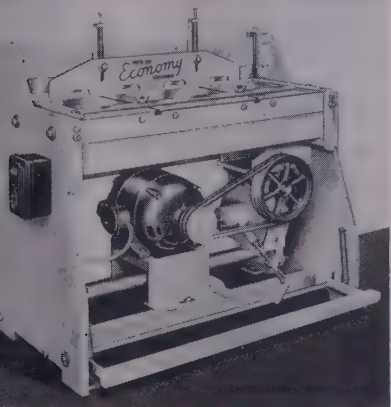
ATLANTA
HOUSTON
TULSA
LOS ANGELES
TORONTO

piece and it is marked as easily as with a rubber stamp. Switches on the machine can be used for continuous operation or momentary contact. Operation is on 115 or 230 50-60 cycle current.

Check No. 16 on Reply Card for more Details

Power Shear

Utilizing a self-contained direct drive unit, the power operated 16-gage capacity metal shear built by Acme Equipment Co. Inc., 126 S. Clinton St., Chicago, Ill., has an operating cycle of 60 strokes per minute which can be varied if desired. The drive unit, which runs in oil,



consists of hardened steel worm and bronze worm gear units, sliding 4-jaw clutch, driver and cam which gives a smooth action at a slight foot treadle pressure.

One complete revolution, in which the knife bar is brought down smoothly and evenly for the cut and returned to top position, is accomplished each time the foot treadle is depressed. Shears are offered in three cutting lengths: 36, 42 and 52 inches. The smallest is powered by a 2 hp motor and the larger two by 3 hp motors.

Check No. 17 on Reply Card for more Details

Automatic Lathe

Developed for heavy duty work, the No. 24 hydraulic automatic lathe, made by Gisholt Machine Co., Madison 10, Wis., swings 35½ inches over the bedways. Standard equipment consists of front and rear carriages, each with its own auxiliary slide. Each slide has its own pump and controls and can be mounted to traverse and feed at any angle to the spindle centerline.

Spindle speeds are selected by pick-off gears and the starting and stopping of the spindle is part of the automatic cycle. Hydraulic controls



UNITCASTINGS — are *Accurate* castings . . . all the way

The increased demand for greater accuracy in steel castings is being met at Unitcast. Consistently high quality, upheld by rigid standards, makes Unitcastings *fit* customers' specifications from contour to physical properties . . . *accurate all the way!*

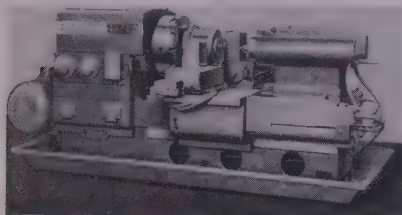
Typical of the methods that control the quality of Unitcastings is illustrated above. This periodic check on a molding operation is only one of 33

similar "inspections" along the production line that assures accuracy in Unitcastings!

The advantages of Unitcast's modern methods can be applied to your steel casting problems. A few minutes time with a Unitcast representative may prove valuable toward cost reduction! Write today! Unitcast Corporation, Steel Casting Division, Toledo 9, Ohio. In Canada: Canadian-Unitcast Steel, Ltd., Sherbrooke, Quebec.

UNITCAST
Corporation
ELECTRIC STEEL CASTINGS

simplify setup by permitting the operator to make the slides run separately, stop at any point, back up or continue the cycle. Thirty-two possible speed combinations are available within each of the following

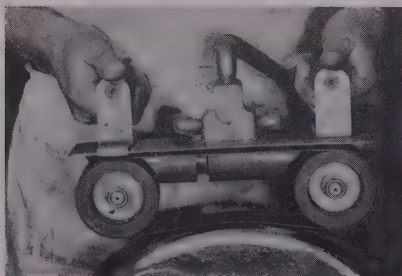


ranges: First range, 25 to 136 rpm; second range, 38 to 208 rpm; third range, 53 to 290 rpm; fourth range, 69 to 378 rpm. Maximum infinitely variable feed is 0.125-inch.

Check No. 18 on Reply Card for more Details

Belt Sander

Adaptable for metal work on all types of surfaces, whether concave or convex, is the air-driven belt sander announced by Buckeye Tools Corp., 21 W. Apple St., Dayton 1, O. It will function on both sheet



metal and solid castings and all types of materials in iron, steel, brass, bronze, solder, aluminum and magnesium. It is also suitable for finishing and sanding wood products.

Check No. 19 on Reply Card for more Details

HAND TOOLS: Two new hand tools are introduced by Whitney Metal Tool Co., Rockford, Ill. Dove tail notcher No. 121 is designed for rapid, single-action dovetailing when installing collars, stubs, Y-joints, etc. Snap-Lock punch No. 131 is capable of producing uniform ears which snap under and lock firmly on the seamed edge of a joining piece.

Check No. 20 on Reply Card for more Details

VALVE: A new type of valve installation centered around a new Full-Flor master valve places 3-way valves, one normally open and one normally closed, at each end of the cylinder. Operation is effected by a

small pilot valve which can be manually, mechanically or electrically actuated. This arrangement permits elimination of long lengths of large diameter pipes between valve and cylinder. Valves are offered by Ross Operating Valve Co., Detroit 3, Mich.

Check No. 21 on Reply Card for more Details

ADDITIVE: Called Aerolube 70, a new all chemical additive, offered by American Cyanamid Co., New York 20, N. Y., will improve operating characteristics of motor oils. It is also an oxidation and bearing corrosion inhibitor.

Check No. 22 on Reply Card for more Details

SLOT INSULATION: Known as Irv-O-Slot, the new insulation offered by Irvington Varnish & Insulator Co., Irvington 11, N. J., employs a newly-developed binder for bonding the varnished cambric to the paper stock. Material will withstand 288 hours at 150° C, retaining its bond without migrating.

Check No. 23 on Reply Card for more Details

CALL UNIT: A new code call unit with the principal function of locating a person who fails to answer the telephone is manufactured by Signal Engineering & Mfg. Co. New York, N. Y. The phone operator presses the button broadcasting the person's code call number three times on signaling devices located throughout the premises.

Check No. 24 on Reply Card for more Details

RUST INHIBITIVE PRIMER: Totrust, a rust inhibitive paint primer and finish coat made by Wilbur & Williams Co., Boston 15, Mass., is offered with the improvement of deeper penetration, high gloss and tougher weathering. It gets into rusted pits and inhibits rust at its source to prevent further corrosion.

Check No. 25 on Reply Card for more Details

TEST BENCHES: New line of Unitized test benches includes eighteen different all steel units, including drawers, cupboards, sinks, tables, storage cases, etc. Made by Fisher Scientific Co., Pittsburgh 19, Pa., they are designed to be joined easily one to another to form benches either 30 or 36 inches high.

Check No. 26 on Reply Card for more Details

HANDPIECE COUPLING: Wyzenbeek & Staff Inc., Chicago, Ill., announces the Wyco quick-change handpiece coupling for flexible shaft machines. With the quick-change feature, quick, snap on or off changes are made from a straight handpiece to an angle head, or from a grinder

to a sander and then to a buffer wire brush wheel without loss of time and with complete safety to the operator.

Check No. 27 on Reply Card for more Details

TESTER: A green core hardness tester being marketed by Harry Dietert Co., Detroit 4, Mich., will measure the green hardness to which a green core is rammed. Hardness number is read from a dial reading from 0 to 100 hardness scale.

Check No. 28 on Reply Card for more Details

SAFETY BLOCKS: Magliner magnesium safety blocks, introduced by Magline Inc., Pinconning, Mich., are used in metal forming presses as a safeguard to men working with the opening of a press. They are available in any required length and in three sizes.

Check No. 29 on Reply Card for more Details

SWIVEL CONNECTORS: Cleveland Vibrator Co., Cleveland 13, O., has announced a new line of airtight swivel connectors for use with all types of compressed air-operated tools. Providing a 360 degree swivel action, they can be provided in straight or L-types to fit hoses from 1/4 to 1-inch in size and pipe from 1/8 to 1-inch in size.

Check No. 30 on Reply Card for more Details

ADJUSTING NUT: Gairing Tool Co., Detroit 32, Mich., announces the Ful-Grip micro-nut. The new adjusting nut is recommended for individual tool adjustment on multiple spindle setups, and may be used with threaded adapters and holder assemblies with or without keyways.

Check No. 31 on Reply Card for more Details

DUAL VALVE: Development of a 36-inch by 8-inch, 150 pound class steel dual valve for an operating temperature of 1000° F, is announced by R-S Products Corp., Philadelphia 44, Pa. Designated as No. 725, it is designed for either a high pressure drop and small volume or a low pressure drop and large volume. Available in all materials and in various combination of sizes.

Check No. 32 on Reply Card for more Details

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It will receive prompt attention

Market Summary

BARRING serious labor trouble over the next month or two, July promises to be about the dulllest month experienced in the iron and steel markets in years. Threat of a steel strike at mid-month caused a mild flurry of inquiry and increased pressure on the mills for shipments as consumers sought protective covering. But this was short lived. Once the threat of an immediate work stoppage was removed the market, generally speaking, settled back into the doldrums with buyers holding a conservative buying course.

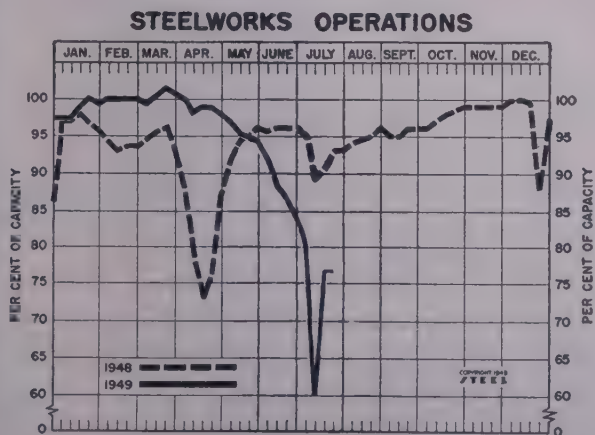
INVENTORIES— Steel mill order backlogs continue to shrink with shipments outstripping new tonnage bookings. Here and there, however, a few signs of reviving buyer concern over inventories have been noted of late. These will likely increase as plants reopen following vacation shutdowns and fall production schedules are set up. Inventories, in the main, still are being liquidated but some consuming interests appear to have permitted stocks to fall below the safety point. Such users are expected to return to the market as active buyers along with others projecting substantial increases in manufacturing schedules. Among the latter are a number of household appliance firms whose operations have been curtailed for months past. Continued threat of a steel strike in event the wage issue is not resolved in the next 60 days may spur some protective buying over coming weeks. Also, should the steelworkers win a wage increase this may knock in the head consumer hopes for a general steel price reduction and might likely result in the placement of considerable tonnage that has been withheld pending determination of the steel price trend.

LABOR— Biggest puzzler for the steel markets at the moment concerns the labor outlook. The steel wage issue still is very much alive. Just what recommendations will come from the President's fact-finding panel is unknown, of course, but whatever they are they are certain

to exert profound influence on the overall labor relations situation. Some observers are wondering whether the procedure in the steel dispute spells doom for free collective bargaining. Also, they are concerned as to the extent the wage decision will affect adjustments in the general price structure. Most of all, they are pondering the question whether the steel procedure will become the pattern for handling wage disputes in other industries. Pending settlement of the steel case no answer to any of these questions is possible, and it is clear that lacking a definite basis for policy making the steel markets are bound to be hamstrung by the resulting uncertainty.

PRICES—The future trend of steel prices is clouded by the uncertainties with respect to wages. Consumers for some time past have been anticipating substantial reductions. However, it appears unlikely any downward adjustments can be counted upon in view of the uncertainty with respect to wages. In event a wage increase is granted the steelworkers, it would seem highly unlikely that any significant downward revision in steel prices would be effected. Meanwhile the steelmakers are marking time on prices. No significant changes were reported last week. STEEL's arithmetical price composites held unchanged and compared with those for the like week of 1948 as follows: Finished steel, \$91.82 and \$80.27; semifinished steel, \$62.12 and \$68.62; steelmaking pig iron, \$45.60 and \$40.74; steelmaking scrap, \$19.17 and \$40.83.

PRODUCTION— Blast furnaces that were banked when a steel strike seemed imminent have been returned to production. In general, steelmaking was unaffected by the strike threat since few open hearths had been removed from the active list. Last week the national ingot rate was estimated at 77 per cent, unchanged from the preceding week with gains in some districts offsetting declines in others.



DISTRICT STEEL RATES				
	Percentage of Ingot in Leading Week Ended July 23	Capacity engaged Districts	Same Week	
			1948	1947
			Change	
Pittsburgh	73.5	None*	90.5	97
Chicago	85.5	+ 4.5*	88	93.5
Eastern Pa.	80	None	90	94
Youngstown	70	- 5	100	90
Wheeling	85.5	+ 4.5	89	86.5
Cleveland	88	+ 23*	99	92
Buffalo	93	+ 5.5	99	88.5
Birmingham	100	None	100	99
New England	80	- 30	83	60
Cincinnati	91	- 5	96	87
St. Louis	87	+ 11.5	78	84.5
Detroit	102	None	100	92
Western	77	+ 2	..	..
Estimated national rate	77	None	93	95

Based on weekly steelmaking capacity of 1,843,516 net tons for 1949; 1,802,476 net tons for 1948; 1,749,928 tons for 1947. *Revised.

COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Month July 23 1949	Month June 16 1949	Year May 1949	Year April 1949	5 Years July 1944
Finished Steel	\$91.82	\$91.82	\$92.06	\$80.27	\$56.73
Semifinished Steel	62.12	62.12	65.28	68.62	36.00
Steelmaking Pig Iron	45.60	45.60	45.60	40.49	23.00
Steelmaking Scrap	19.17	19.17	20.85	41.43	19.17

* STRAIGHT ARITHMETICAL COMPOSITES: Computed from average industry-wide mill prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (re-rolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading producing points), and on Steelworks Scrap (No. 1).

† FINISHED STEEL WEIGHTED COMPOSITE: Computed in cents per pound, mill prices, weighted by actual monthly shipments of following products, representing about 82 per cent of steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates, standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip. June, 1949, figure is preliminary.

FINISHED STEEL
WEIGHTED COMPOSITE†

June 1949	4.01731c
May 1949	4.01731c
Apr. 1949	4.02031c
June 1948	3.57740c
June 1944	2.46683c

COMPARISON OF PRICES

Representative market figures for current week; average for last month, three months and one year ago. Finished material (except tin plate) and wire rods, cents per lb; semifinished (except wire rods) and coke, dollars per net ton, others dollars per gross ton. Delivered prices represent lowest from mills.

Finished Materials

	July 23, 1949	June, 1949	Apr., 1949	July, 1948
Steel bars, Pittsburgh mills.....	3.35c	3.35c	3.35c	3.105c
Steel bars, del. Philadelphia.....	3.8164	3.8164	3.8164	3.545
Steel bars, Chicago mills.....	3.35	3.35	3.35	3.065
Shapes, Pittsburgh mills.....	3.25	3.25	3.25	2.975
Shapes, Chicago mills.....	3.25	3.25	3.25	2.965
Shapes, del. Philadelphia.....	3.4918	3.4918	3.4918	3.18
Plates, Pittsburgh mills.....	3.40	3.40	3.50	3.155
Plates, Chicago mills.....	3.40	3.40	3.40	3.115
Plates, del. Philadelphia.....	3.5848	3.5848	3.6348	3.41
Sheets, hot-rolled, Pittsburgh mills	3.25	3.25	3.26	2.975
Sheets, cold-rolled, Pittsburgh mills	4.00	4.00	4.00	3.70
Sheets, No. 10 galv., Pittsburgh....	4.40	4.40	4.40	4.10
Sheets, hot-rolled, Gary mills.....	3.25	3.25	3.25	2.965
Sheets, cold-rolled, Gary mills.....	4.00	4.00	4.00	3.70
Sheets, No. 10 galv., Gary mills....	4.40	4.40	4.40	4.10
Strip, hot-rolled, Pittsburgh mills..	3.25	3.25	3.30	3.140
Strip, cold-rolled, Pittsburgh mills..	4.375	4.375	4.375	3.965
Bright basic, wire, Pittsburgh.....	4.15	4.15	4.15	3.965
Wire nails, Pittsburgh mills.....	5.15	5.15	5.15	5.255
Tin plate, per base box, Pitts. dist.	\$7.75†	\$7.75†	\$7.75†	\$6.74

Pig Iron

	July 23, 1949	June, 1949	Apr., 1949	July, 1948
Bessemer, del. Pittsburgh (N.&S. sides)	\$48.08	\$48.08	\$48.08	\$44.08
Basic, Valley	46.00	46.00	46.00	40.60
Basic eastern, del. Philadelphia.....	49.39	49.39	49.6175	43.77
No. 2 fdry., del. Fgh. (N.&S. sides)	47.58	47.58	47.58	43.58
No. 2 fdry., del. Philadelphia.....	49.89	49.89	50.1175	44.27
No. 2 foundry, Chicago.....	46.25	46.25	46.25	41.10
No. 2 foundry, Valley.....	46.50	46.50	46.50	41.10
Southern No. 2 Birmingham.....	39.38	39.38	43.38	40.72
Southern No. 2 del. Cincinnati.....	45.43	45.43	49.43	46.43
Malleable, Valley	46.50	46.50	46.50	40.30
Malleable, Chicago	46.50	46.50	46.50	41.50
Charcoal, low phos., fob Lyles, Tenn.	66.00	66.00	66.00	59.60
Ferromanganese, f.o.b. Etna, Pa. ..	175.00	175.00	175.00	150.00

SCRAP

Heavy melt. steel, No. 1, Pittsburgh	\$21.00	\$22.60	\$25.12	\$40.75
Heavy melt. steel, No. 2, E. Pa. ...	16.00	17.75	20.69	40.00
Heavy melt. steel, No. 1, Chicago...	19.50	20.70	23.75	40.05
Heavy melt. steel, No. 1 Valley...	18.50	21.30	22.75	40.75
Heavy melt. steel, No. 1 Cleveland.	15.00	17.80	20.38	40.25
Heavy melt. steel, No. 1 Buffalo...	19.25	20.35	24.38	44.30
Rails for rerolling, Chicago.....	27.75	27.75	31.31	57.80
No. 1 cast, Chicago.....	27.50	27.50	30.25	68.50

COKE

Connellsville, beehive furnace.....	\$13.25	\$13.70	\$14.44	\$14.25
Connellsville, beehive foundry	15.75	16.15	17.00	17.00
Chicago, oven foundry, ovens.....	20.00	20.24	20.40	19.80

Semifinished

Sheet bars, mill	\$67.00*	\$67.00*	\$67.00*	\$62.80
Slabs, Chicago	52.00	52.00	52.00	47.80
Re-rolling billets, Pittsburgh.....	52.00	52.00	52.00	47.80
Wire rod $\frac{3}{8}$ to $\frac{1}{2}$ -inch, Pitts. dist..	3.40c	3.40c	3.775c	3.415c

* Nominal. † 1.50 lb coating.

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual product basis to products within the range of sizes, grades, finishes and specifications produced at its plants.

Semifinished Steel

Carbon Steel Ingots: Re-rolling quality, standard analysis, nominal. Forging quality, \$50 per net ton mill.

Alloy Steel Ingots: \$51 per net ton, mill.

Re-rolling Billets, Blooms, Slabs: \$52 per net ton, mill, except: \$57, Conshohocken, Pa.; \$71, Fontana, Calif.

Forging Quality Billets, Blooms, Slabs: \$61 per net ton, mill, except: \$63, Conshohocken, Pa.; \$80, Fontana, Calif.

Alloy Billets, Slabs, Blooms: Re-rolling quality, \$63 per net ton, mill except: \$65 Conshohocken, Pa.; \$82, Fontana, Calif.

Sheet Bars: Nom., per net ton, mill; sales in open market \$50-\$55 per gross ton.

Skelp: 3.25c per lb, mill.

Tube Rounds: \$76 per net ton, mill.

Wire Rods: Basic and acid open-hearth, 7/32 & $\frac{1}{2}$ -inch, inclusive, 3.40c per lb, mill, except: 3.70c, Worcester, Mass.; 4.05c, Pittsburgh, Calif.; 4.10c, Los Angeles. Basic open-hearth and bessemer, 7/32 to 47/64-in., inclusive, 3.50c, Sparrows Point, Md.

Bars

Hot-Rolled Carbon Bars (O.H. only; base 20 tons): 3.35c, mill, except: 3.50c Atlanta; 3.55c, Ecorse, Mich.; 3.75c, Houston; 3.95c, Kansas City; 4.00c, Fontana, Calif.; 4.05c, Pittsburgh, Torrance, Calif.; 4.10c, S. San Francisco, Los Angeles, Niles, Calif.; Portland, Oreg., Seattle; 4.25c, Minnequa, Colo.

Rail Steel Bars: (Base 10 tons): 3.35c Huntington, W. Va., and Moline, Ill.; 4.00c, Williamsport, Pa.

Hot-Rolled Alloy Bars: 3.75c, mill, except: 4.05c, Ecorse, Mich.; 4.80c, Los Angeles; 4.75c, Fontana, Calif.

Cold-Finished Carbon Bars (Base 40,000 lb and over): 4.00c, mill, except: 3.95c, Pittsburgh, Cumberland, Md.; 4.20c, Indianapolis; 4.30c, Ecorse, Mich.; 4.35c, St. Louis; 4.36c, Plymouth, Mich.; 4.40c Newark, N. J.; Hartford, Putnam, Conn., Mansfield, Readville, Mass.; 4.48c, Camden, N. J.; 5.40c, Los Angeles.

Cold-Finished Alloy Bars: 4.65c, mill, except: 4.85c, Indianapolis; 4.95c, Worcester, Mansfield, Mass., Hartford, Conn.

High-Strength, Low-Alloy Bars: 5.10c, mill, except: 5.30c, Ecorse, Mich.

Reinforcing Bars (New Billet): 3.35c, mill, except: 3.50c, Atlanta; 4.00c, Fontana, Calif.; 3.75c, Houston; 3.95c, Kansas City; 4.05c, Pittsburgh, Torrance, Calif.; 4.10c, Seattle, S. San Francisco, Los Angeles; 4.25c, Minnequa, Colo. Fabricated: To consumers: 4.25c, mill, except: 5.00c, Seattle.

Reinforcing Bars (Rail Steel): 3.85c, Williamsport, Pa., mill; 3.35c, Huntington, W. Va.

Wrought Iron Bars: Single Refined: 8.60c, (hand puddled), McKees Rocks, Pa.; 9.50c, Economy, Pa. Double Refined: 11.25c (hand puddled), McKees Rocks, Pa.; 11.00c, Economy, Pa. Staybolt: 12.75c, (hand puddled), McKees Rocks, Pa.; 11.30c, Economy, Pa.

Sheets

Hot-Rolled Sheets (18-gage and heavier): 3.25c, mill, except: 3.45c, Ecorse, Mich.; 3.65c, Houston; 3.35c, Conshohocken, Pa.; 3.95c, Pittsburgh, Torrance, Calif.; 4.15c, Fontana, Calif.

Hot-Rolled Sheets (19 gage and lighter, annealed): 4.15c, mill, except: 4.40c, Alabama

City, Ala.; 5.05c, Torrance, Calif.; 5.25c, Kokomo, Ind.

Cold-Rolled Sheets: 4.00c, mill, except: 4.20c, Ecorse, Mich.; Granite City, Ill.; 4.90c, Fontana, Calif.; 4.95c, Pittsburgh, Calif.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) 4.40c, mill, except: 4.80c, Kokomo, Ind.; 5.15c, Pittsburgh, Torrance, Calif.

Galvannealed Sheets: 4.95c, mill, except: 5.30c, Kokomo, Ind.

Culvert Sheets, No. 16 flat Copper Steel (based on 5-cent zinc): 5.00c, mill, except: 5.40c, Granite City, Ill.; Kokomo, Ind.; 5.75c, Pittsburgh, Torrance, Calif.

Long Terns, No. 10 (Commercial quality): 4.80c, mill.

Enameling Sheets, No. 12: 4.40c mill, except: 4.60c Granite City, Ill.; 4.70c, Ecorse, Mich.

Silicon Sheets, No. 24: Field: 5.15c, mill. Armature: 5.45c, mill, except: 5.95c, Warren Electrical: Hot-rolled, 5.95c, mill, except: 6.05c, Kokomo, Ind.; 6.15c, Granite City, Ill.; 6.45c, Warren, O.

Motor: 6.70c mill, except: 6.90c, Granite City, Ill.; 7.20c, Warren, O.

Dynamo: 7.50c, mill, except: 7.70c, Granite City, Ill.

Transformer 72, 8.05c, mill; 65, 8.60c, mill; 58, 9.30c, mill, 52, 10.10c, mill.

High-Strength Low-Alloy Sheets: Hot-rolled 4.95c, mill, except: 5.15c, Ecorse, Mich. Galvanized (No. 10), 6.75c, mill. Cold-rolled 6.05c, mill, except: 6.25c, Ecorse, Mich.

Strip

Hot-Rolled Strip: 3.25c mill, except: 3.40c, Atlanta; 3.45c, Ecorse, Mich.; 3.60c, Detroit; 3.65c, Houston; 3.85c, Kansas City, Mo.; 4.00c, Pittsburg, Torrance, Calif.; 4.25c, Seattle, San Francisco, Los Angeles; 4.30c, Minnequa, Colo.; 4.40c, Fontana, Calif. One company quotes 4.90c, Pittsburg base.

Cold-Rolled Strip (0.25 carbon and less): 4.00c, mill, except: 4.00-4.25c, Warren, O.; 4.15c, Riverdale, Ill.; 4.20c, Ecorse, Mich.; 4.20-4.25c, Detroit; 4.25c, Dover, O.; 4.50c, New Haven and Wallingford, Conn.; 4.50c, Chicago; 4.50-5.00c, Trenton, N. J.; 4.90c, Fontana, Calif.; 5.75c, Los Angeles. One company quotes 4.50c, Pittsburg base; another, 4.55c, Cleveland or Pittsburgh base, and 4.75c, Worcester, Mass., base.

Cold-Finished Spring Steel: 0.26-0.40 C, 4.00c, mill, except: 4.25c, Dover, O., Chicago; 4.30c, Worcester, Mass.; 4.50c, Boston, Youngstown, Wallingford, Conn. Over 0.40 to 0.60 C, 5.50c, mill except: 5.65c, Chicago; 5.75c, Dover, O.; 5.80c, Worcester, Mass., Wallingford, Conn., Trenton, N. J.; 5.95c, Boston. Over 0.60 to 0.80 C, 6.10c, mill, except: 6.25c, Chicago; 6.35c, Dover, O.; 6.40c, Worcester, Mass., Wallingford, Bristol, Conn., Trenton and Harrison, N. J. Over 0.80 to 1.05 C, 8.05c, mill, except: 7.85c, Dover, O.; 8.20c, Chicago; 8.35c, Worcester, Mass., Bristol, Conn., Trenton and Harrison, N. J. Over 1.05 to 1.35 C, 10.35c, mill, except: 10.15c, Dover, O.; 10.50c, Chicago; 10.65c, Worcester, Mass., Trenton and Harrison, N. J.

Cold-Rolled Alloy Strip: 9.50c, mill except: 9.80c, Worcester, Mass., Harrison, N. J.

High-Strength, Low-Alloy Strip: Hot-rolled, 4.95c, mill, except: 5.15c, Ecorse, Mich. Cold-rolled, 6.05c, mill, except: 6.25c, Ecorse, Mich.

Tin, Terne, Plate

Tin Plate: American Coke, per base box of 100 lb, 1.25 lb coating \$7.50-\$7.70; 1.50 lb coating \$7.75-\$7.95. Pittsburg, Calif., mill \$8.25 and \$8.50, respectively, for 1.25 and 1.50 lb coatings.

Electrolytic Tin Plate: Per base box of 100 lb, 0.25 lb tin, \$6.45-\$6.65; 0.50 lb tin, \$6.70-\$6.90; 0.75 lb tin, \$7.00-\$7.20.

Can Making Black Plate: Per base box of 100 lb, 55 to 128 lb basis weight \$5.75-\$5.85. Pittsburg, Calif., mill, \$6.50.

Holloware Enameling Black Plate: 29-gage, 5.30c per pound, except: 5.40c, Sparrows Point, Md.; 5.50c, Granite City, Ill.

Manufacturing Ternes (Special Coated): Per base box of 100 lb, \$6.65, except: \$6.75 Fairfield, Ala., Sparrows Point, Md.

Roofing Ternes: Per package 112 sheets; 20 x 28 in., coating I.C. 8-lb, \$17.50.

Plates

Carbon Steel Plates: 3.40c, mill, except: 3.50c, Coatesville, Pa.; Claymont, Del.; Conchohocken, Pa.; Harrisburg, Pa.; 3.65c, Ecorse, Mich.; 3.80c, Houston; 4.00c, Fontana, Calif.; 4.30c, Seattle, Minnequa, Colo.; 6.25c, Kansas City, Mo.

Floor Plates: 4.55c, mill.

Open-Hearth Alloy Plates: 4.40c, mill, except: 4.50c, Coatesville, Pa., mill.

High-Strength, Low-Alloy Plates: 5.20c mill, except: 5.40c, Ecorse, Mich.

Shapes

Structural Shapes: 3.25c, mill, except: 3.30c, Bethlehem, Johnstown, Pa.; Lackawanna, N. Y.; 3.65c, Houston; 3.80c, S. San Francisco, Fontana, Calif.; 3.85c, Kansas City, Mo., Torrance, Calif.; 4.15c, Minnequa, Colo.; 4.30c, Seattle, Los Angeles.

Alloy Structural Shapes: 4.05c, mill.

Steel Sheet Piling: 4.05c, mill.

High-Strength, Low-Alloy Shapes: 4.95c, mill, except: 5.05c, Bethlehem, Johnstown, Pa.; Lackawanna, N. Y.

Wire and Wire Products

Wire to Manufacturers (carloads): Bright, Basic or Bessemer Wire, 4.15c, mill, except: 4.25c, Sparrows Point, Md.; Kokomo, Ind.; 4.45c, Worcester, Mass.; 4.50c, Minnequa, Colo.; Atlanta, Buffalo; 4.75c, Kansas City, Mo.; 4.80c, Palmer, Mass.; 5.10c, Pittsburg, Calif.; 5.15c, S. San Francisco. One producer quotes 4.15c, Chicago base; another 4.50c, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Basic MB Spring Wire, 5.55c, mill, except: 5.65c, Sparrows Point, Md.; 5.85c, Worcester, Palmer, Mass., Trenton, N. J.; 6.50c, Pittsburg, Calif.

Upholstery Spring Wire, 5.20c mill, except: 5.30c, Sparrows Point, Md.; Williamsport, Pa.; 5.50c, Worcester, Mass., Trenton, N. J., New Haven, Conn.; 6.15c, Pittsburg, Calif.

Wire Products to Trade (carloads): Merchant Quality Wire: Annealed (6 to 8 Gage base), 4.80c, mill except: 4.90c, Sparrows Point, Md.; Kokomo, Ind.; 4.95c, Atlanta; 5.10c, Worcester, Mass.; 5.15c, Minnequa, Colo.; 5.75c, S. San Francisco, Pittsburg, Calif. One producer quotes 4.80c, Chicago and Pittsburgh base; another, 5.20c, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Galvanized (6 to 8 Gage base), 5.25c, mill, except: 5.35c, Sparrows Point, Md.; Kokomo, Ind.; 5.40c, Atlanta; 5.55c, Worcester, Mass.; 5.60c, Minnequa, Colo.; 6.20c, Pittsburg, S. San Francisco, Calif. One producer quotes 5.25c, Pittsburgh and Chicago base; another, 5.65c, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Nails and Staples: Standard, cement-coated and galvanized nails and polished and galvanized staples, Col. 103, mill, except: 105, Sparrows Point, Md.; Kokomo, Ind., Atlanta; 109, Worcester, Mass.; 110, Minnequa, Colo.; Cleveland; 123, Pittsburg, Calif. One producer quotes Col. 103, Chicago and Pittsburgh base; another, Col. 113, Crawfordsville, Ind.; 111 Houston, freight equalized with Birmingham and Pittsburgh.

Woven Fence (9 to 15½ Gage, inclusive): Col. 109, mill, except: 111, Kokomo, Ind., Atlanta; 116, Minnequa, Colo.; 132, Pittsburg, Calif. One producer quotes Col. 109, Pittsburgh and Chicago base; another, Col. 114, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Barbed Wire: Col. 123 mill, except: 125, Sparrows Point, Md.; Kokomo, Ind., Atlanta; 130, Minnequa, Colo.; 143, Pittsburg, Calif.; 145, S. San Francisco. One producer quotes Col. 123, Chicago and Pittsburgh base.

Fence Posts (with clamps): Col. 112, Duluth, Joliet; 121, Moline, Ill.; 122, Minnequa, Colo.; 125, Johnstown, Pa.; \$120 per net ton, Williamsport, Pa.

Bale Ties (single loop): Col. 106, mill, except: 107, Atlanta; 108, Sparrows Point, Md.; Kokomo, Ind.; 113, Minnequa, Colo.; 130, S. San Francisco, Pittsburg, Calif. One producer quotes Col. 115, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Bolts, Nuts

Prices to consumers, f.o.b. midwestern plants. Sellers reserve right to meet competitors' prices, if lower. Additional discounts on carriage and machine bolts, 5 for carloads; 15 for full containers, except tire and plow bolts.

Carriage and Machine Bolts
½-in. and smaller; up to 6 in. in length 35 off
¾ and ¾ x 6-in. and shorter 37 off
¾ and larger x 6-in. and shorter 34 off
All diameters longer than 6-in. 30 off
Tire bolts 25 off
Plow bolts 47 off
Lag bolts, 6 in. and shorter 37 off
Lag bolts, longer than 6 in. 35 off

Stove Bolts
In packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts		A.S. Reg.	A.S. Heavy
Semifinished hexagon	Light		
¾-in. and smaller	41 off		
½-in. and smaller	38 off		
½-in.-1-in.	39 off		
¾-in.-1-in.	37 off		
1½-in.-1½-in.	37 off		
1½-in. and larger	34 off		

Hexagon Cap Screws (Packaged)
Upset 1-in. smaller by 6-in. and shorter (1020 bright) 46 off
Upset (1035 heat treated)
¾ and smaller x 6 and shorter 40 off

Square Head Set Screws
Upset 1-in. and smaller 51 off
¾, ¾, and 1 x 6-in. and shorter 35 off
Headless, ¼-in. and larger 31 off

Rivets

F.o.b. midwestern plants
Structural ½-in. and larger 6.75c
¾-in. and under 48 off

Washers, Wrought

F.o.b. shipping point, to jobbers. Net to \$1 off

For prices of stainless and tool steels please refer to July 11 issue, Page 131.

Tubular Goods

Standard Steel Pipe: Eastern mill carlot prices, threaded and coupled, to consumers about \$200 a net ton. Discounts from base:

Butt Weld					
In.	Blk.	Gal.	In.	Blk.	Gal.
½.....	39½	11-	1.....	46½	30½-
¾.....	41½	13½		48½	33½-
1.....	37½	13-	1½....	47-	31-
	39½	15½		49	34-
¾.....	34-	9½-	1½....	47½-	31½-
	36	12½		49½	34½-
1½.....	41-	23½-	2.....	48-	32-
	43	26½		50	35
¾.....	44-	27½-	2½, 3..	48½-	32½-
	46	30½		50½	35½
			3½ & 4	44½	29

Lap Weld					
In.	Blk.	Gal.	Elec. Weld	Blk.	Gal.
2.....	40½	25	38½	23	12½-
				38½	23
2½..	44½	29	41½	26	18-
				41½	26
3....	44½	29	41½	26	20½
				41½	26
3½ & 4	42½-	26-	43½	28	23-
	46½	31		43½	28
5 & 6.	42½-	26-	43½	28	28
	44½	29			
7.....	.....	.....	.....	43½	27

Line Steel Pipe: Mill prices in carlots to consumers about \$200 a net ton.

Butt Weld					
In.	Blk.	Gal.	In.	Blk.	Gal.
½.....	40½	12½	1½....	46-	32-
¾.....	38½	14½		48	33
1.....	35	11½	1½....	46½-	32½-
¾.....	40-	24½-		48½	33½
	42	25½	2.....	47-	33-
¾.....	43-	28½-		49	34
	45	29½	2½ & 3.	47½-	33½-
1.....	45½-	31½-		49½	34½
	47½	32½	3½ & 4.	43½	28

Lap Weld					
In.	Blk.	Gal.	Elec. Weld	Blk.	Gal.
2....	39½	24	37½	22	11½-
				37½	22
2½..	43½	28	40½	25	17-
				40½	25
3....	43½	28	40½	25	19½-
				40½	25
3½-4.	41½-	28½-	42½	27	37½-
	45½	30		42½	27
5 & 6	41½-	28-	42½	27	42½
	43½	28½			
8....	45½	29	44½	28	44½
	45	28½	44	27½	44
10..	44	27½	43	26½	43
12..	44	27½	43	26½	43

Standard Wrought Iron Pipe: Mill price in carlots, threaded and coupled, to consumers about \$200 a net ton.

Butt Weld					
In.	Blk.	Gal.	In.	Blk.	Gal.
¾...	+59	+90	1½..	+22	+47½
1½..	+20	+47	1½..	+15½	+40
¾...	+10	+36	2....	+7½	+31
1 and			2½-3	+5	+28½
1½	+4	+27	4....	List	+20½
1½	+2	+23½	4½-8	+2	+22
2....	-2½	+23	9-12.	+12	+31½

Boiler Tubes: Net base c.l. prices, dollars per 100', mill; minimum wall thickness, cut lengths 4 to 24", inclusive.

—Seamless—					
O.D. B.W.	In.	H.R.	O.D.	H.R.	O.D.
1	13	11.50	13.39	13.00	13.00
1½	13	13.62	15.87	13.21	15.39
1½	13	15.05	17.71	14.60	17.18
1½	13	17.11	20.15	16.60	19.54
2	13	19.18	22.56	18.60	21.89
2½	13	21.37	25.16	20.73	24.40
2½	12	23.54	27.70	22.83	26.88
2½	12	25.79	30.33	25.02	29.41
2½	12	27.33	32.14	26.51	31.18
3	12	28.68	33.76	27.82	32.74
3½	11	33.39	39.29	32.39	38.11
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78
4½	9	58.99	69.42	.....	.....
5	9	68.23	80.35	.....	.....
6	7	104.82	123.33	.....	.....

Pipe Cast Iron: Class B, 6-in. and over, \$82.50-\$93.50 per net ton, Birmingham; \$87.50, Burlington, N. J.; 4-in. pipe, \$5 higher; Class A pipe, \$5 a ton over Class B.

Rails, Supplies

Rails: Standard, over 60-lb; \$3.20 per 100 lb mill, except: \$3.30, Minnequa, Colo.
Light (billet): \$3.55 per 100 lb, mill, except: \$4.25, Minnequa, Colo.
Light (rail steel): \$3.55 per 100 lb, Williamsport, Pa.; Huntington, W. Va.
Railroad Supplies: Track bolts, treated: \$8.50 per 100 lb, mill. Untreated: \$8.25, mill.
Tie Plates: 4.05c mill, except: 4.20c, Pittsburg, Torrance, Calif.; 4.50c, Seattle.
Splice Bars: 4.25c, mill.
Standard Spikes: 5.35c, mill.
Axles: 5.20c, mill.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

	Per Gross Ton			
	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., furnace.....	\$48.00	\$48.50	\$49.00	\$49.50
Newark, N. J., del.	50.5334	51.0334	51.5334	52.0334
Brooklyn, N. Y., del. ....	.....	52.634	53.134	.....
Birmingham, furnace	38.88	39.38	.....	.....
Cincinnati, del. ....	.....	45.43	.....	.....
Buffalo, furnace	46.00	46.50	47.00	.....
Boston, del.	54.92	55.42	55.92	.....
Rochester, del.	47.95	48.45	48.95	.....
Syracuse, del.	49.39	49.89	50.39	.....
Chicago, district furnaces...	46.00	46.00-46.50	46.50	47.00
Milwaukee, del.	47.82	47.82-48.32	48.32	48.82
Muskegon, Mich., del. ....	.....	51.28-51.78	51.78	.....
Cleveland, furnace	46.00	46.50	46.50	47.00
Akron, del.	48.3002	48.8002	48.8002	49.3002
Duluth, furnace .....	.....	46.50	46.50	47.00
Erie, Pa., furnace	46.00	46.50	46.50	47.00
Everett, Mass., furnace.....	.....	50.00	50.50	.....
Geneva, Utah, furnace.....	46.00	46.50	.....	.....
Seattle, Tacoma, Wash., del. ....	.....	54.0578	.....	.....
Portland, Oreg., del. ....	.....	54.0578	.....	.....
Los Angeles, San Francisco	53.5578	54.0578	.....	.....
Granite City, Ill., furnace...	47.90	48.40	48.90	.....
St. Louis, del.	48.65*	49.15*	49.65*	.....
Ironton, Utah, furnace.....	47.00	47.50	.....	.....
Lone Star, Tex., furnace...	46.00	46.50	.....	.....
Gulf ports, del.	50.50	51.00	.....	.....
Neville Island, Pa., furnace	46.00	46.50	46.50	47.00
Pittsburgh, del., N.&S. Sides	47.08	47.58	47.58	48.08
Pittsburgh (Carnegie), furnaces	46.00	.....	.....	47.00
Sharpsville, Pa., furnace...	46.00	46.50	46.50	47.00
Steelton, Pa., furnace.....	48.00	48.50	49.00	49.50
Struthers, O., furnace.....	46.00	.....	.....	.....
Swedeland, Pa., furnace.....	48.00	48.50	49.00	49.50
Philadelphia, del.	49.39	49.89	50.39	50.89
Toledo, O., furnace	46.00	46.50	46.50	47.00
Cincinnati, del.	50.8230	51.3230	.....	.....
Troy, N. Y., furnace.....	48.00	48.50	49.00	.....
Youngstown, O., furnace...	46.00	46.50	46.50	47.00
Mansfield, O., del.	50.1022	50.6022	50.6022	51.1022

* Including 3 per cent federal transportation tax.

† Low phosphorus southern grade.

‡ To Neville Island base add: \$0.86 for McKees Rocks, Pa.; \$1.31 Lawrenceville, Homestead, McKeesport, Monaca; \$1.73 Verona; \$1.94 Brackenridge; \$1.08 for Ambridge and Aliquippa.

§ Includes, in addition to Chicago, South Chicago, Ill., East Chicago, Gary and Indiana Harbor, Ind.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent Si (base).....	\$59.50
6.51-7.00 .. 60.50	9.01-9.50 65.50
7.01-7.50 .. 61.50	9.51-10.00 66.50
7.51-8.00 .. 62.50	10.01-10.50 67.50
8.01-8.50 .. 63.50	10.51-11.00 68.50
8.51-9.00 .. 64.50	11.01-11.50 69.50
F.o.b. Jackson, O., per gross ton.	Buffalo furnace \$1.25 higher.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus \$1 per gross ton.

Electric Furnace Silvery Pig Iron

Si 14.01-14.50%, \$78.50 furnace, Niagara Falls; \$80 open-hearth and foundry grade, Keokuk, Iowa, or Wenatchee, Wash., freight allowed to normal trade area. 12½ lb piglets, \$85, Keokuk, Iowa, freight allowed to normal trade area. Add \$1 a ton for each additional 0.5% Si to 18%; \$1 for each 0.5% Mn over 1%; \$1 a ton for 0.45% max. P.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. F.o.b. furnace, Lyles, Tenn., \$66 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Low Phosphorus

Steelton, Pa., Troy, N. Y., \$54; Philadelphia, \$56.9786 del. Intermediate phosphorus, Central Furnaces, Cleveland, \$51.

Electrodes

(Threaded, with nipples, unboxed)

Inches Cents per lb.

Diam.	Length	f.o.b. plant
Graphite		
17, 18, 20	60, 72	16.00
8 to 16	48, 60, 72	16.50
7	48, 60	17.75
8	48, 60	19.00
4, 5½	40	19.50
3	40	20.50
2½	24, 30	21.00
2	24, 30	23.00

Carbon

40	100, 110	7.50
35	100, 110	7.50
30	84, 110	7.50
24	72 to 104	7.50
17 to 20	84, 90	7.50
14	60, 72	8.00
10, 12	60	8.25
8	60	8.50

Fluorspar

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF₂ content, 70% or more, \$37; less than 60%, \$34.

Metallurgical Coke

Price per Net Ton

Beehive Ovens	
Connellsville, furnace...	\$13.00-13.50
Connellsville, foundry...	15.50-16.00
New River, foundry...	18.00
Wise county, foundry...	15.35
Wise county, furnace...	14.60

Oven Foundry Coke	
Kearney, N. J., ovens.	\$22.00
Everett, Mass., ovens.	.....
New England, del.	22.70
Chicago, ovens	20.00
Chicago, del.	21.45
Detroit, del.	23.76
Terre Haute, ovens.....	20.20
Milwaukee, ovens	20.75
Indianapolis, ovens	19.85
Chicago, del.	23.19
Cincinnati, del.	22.66
Detroit, del.	23.61
Ironton, O., ovens.....	19.40
Cincinnati, del.	21.63
Painesville, O., ovens...	20.90
Buffalo, del.	23.42
Cleveland, del.	22.55
Erie, del.	22.70
Birmingham, ovens	17.70
Philadelphia, ovens	20.45
Swedeland, Pa., ovens.	19.50
Portsmouth, O., ovens.	20.65
Detroit, ovens	*21.70
Detroit, del.	22.75
Buffalo, del.	21.98
Flint, del.	21.98
Pontiac, del.	21.98
Saginaw, del.	23.30

Includes representative switching charge of: * \$1.05; † \$1.45. ‡ Or within \$4.03 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens (Price effective as of Aug. 5)	
Pure benzol	20.00
Toluol, one degree	19.00-23.50
Industrial xylol	20.50-26.50
Per ton bulk, ovens	
Sulphate of ammonia	\$45.00
Per pound, ovens (Effective June 1, 1949)	
Phenol, 40 (carlots, returnable drums)	13.25
Do., less than carlots	14.00
Do., tank cars	12.50
(Effective Oct. 25, 1948)	
Naphthalene flakes, balls, bbl to jobbers.	.....
"household use"	13.75

Refractories

(Prices per 1000 brick, f.o.b. plant)

Fire Clay Brick	
Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., \$100. Hard-fired, \$135 at above points.	.....
High-Heat Duty: Salina, Pa., \$85; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., \$80.	.....
Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., \$74.	.....
Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., Ottawa, Ill., \$66.	.....

Ladle Brick	
Dry Press: \$55, Freepot, Merrill Station, Clearfield, Pa., Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.	.....
Wire Cut: \$53, Chester, New Cumberland, W. Va.; Wellsville, O.	.....

Malleable Bung Brick	
St. Louis, Mo., Olive Hill, Ky., Ottawa, Ill., \$90; Beach Creek, Pa., \$80.	.....

Silica Brick	
Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., \$80; Hays, Pa., \$85; Joliet or Rockdale, Ill., E.	.....

Chicago, Ind., \$89; Lehi, Utah, Los Angeles, \$95.	.....
Eastern Silica Coke Oven Shap Claysburg, Mt. Union, Sproul, Pa., Birmingham, \$80.	.....
Illinois Silica Coke Oven Shap Joliet or Rockdale, Ill., E. C. cago, Ind., Hays, Pa., \$81.	.....

Basic Brick

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.) Burned chrome brick, \$66; Chromal-bonded chrome brick, \$66; magnesite brick, \$91; chemically bonded magnesite, \$80.

Magnesite

(Base prices per net ton, f.o.b. works, Chewelah, Wash.) Domestic dead-burned, ½" grain Bulk, \$30.50-31.00; single pay bags, \$35.00-35.50.

Dolomite

(Base prices per net ton) Domestic, dead-burned bulk: Bismeyer, Blue Bell, Williams, Portmouth Meeting, Pa., Millville, Va., Narlo, Millersville, Pa., Gibsonburg, Woodville, O., \$12.25; Thornton, McCook, Ill., \$12.25; Dolly Siding, Bonne Terre, Mo., \$12.45.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural)

Lower Lake Ports

(Any increase or decrease in R. freight rates, dock handling charges and taxes thereon effective after Dec. 31, 1948, are for buyer's account.) Old range bessemer \$7. Old range nonbessemer 7. Mesabi bessemer 7. Mesabi nonbessemer 7. High phosphorus 7.

Eastern Local Ore

Cents, unit, del. E. Pa. Foundry and basic 56.62% concentrates, contract 16.

Foreign Ore

Cents per unit, c.i.f. Atlantic ports Swedish basic, 60 to 68%: Spot 17. Long-term contract 15. Brazil iron ore, 68-69% 19.

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid \$26-28

Manganese Ore

Long term contracts, involving large tonnages, prices are nominal; net by, 48%, duty paid, 81.8c-83.8c per long ton unit, c.i.f. United States ports; prices on lower grades adjusted to manganese content and impurities.

Chrome Ore

Gross ton f.o.b. cars, New York Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (\$8 S paying for discharge; d basis, subject to penalties guarantees are not met.)

Indian and African	
48% 2.8:1	37.
48% 3:1	39.
48% no ratio	31.
South African (Transvaal)	
44% no ratio	\$25.50-26.
45% no ratio	26.
48% no ratio	29.00-30.
50% no ratio	29.50-30.

Brazilian—nominal	
44% 2.5:1 lump	\$33.

Rhodesian	
45% no ratio	\$27-27.
48% no ratio	30.
48% 3:1 lump	39.
Domestic (seller's nearest rail)	
48% 3:1	\$39.

Molybdenum

Sulphide conc., lb. Mo., cont., Mines \$0.

WAREHOUSE STEEL PRICES

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS		H.R. Alloy 4140§	Standard Structural Shapes	PLATES	
	H.R. 18 Ga. and Heavier*	C.R. 15 Ga.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.			Carbon	Floor
New York (city)	5.80†	6.51	7.10	5.82	...	5.77	6.56	8.28	5.53	5.85	7.36
New York (c'try)	5.60†	6.31	6.90	5.62	...	5.57	6.36	8.08	5.33	5.65	7.16
Boston (city) ..	5.70	6.70**	7.11	5.75	...	5.67	6.42	8.72	5.57	5.90	7.40
Boston (c'try) ..	5.55	6.55**	6.96	5.60	...	5.52	6.27	8.57	5.42	5.75	7.25
Phila. (city)...	5.80	6.39	6.73	5.55	...	5.55	6.09	8.00	5.25	5.50	6.70
Phila. (c'try) ..	5.65	6.24	6.58	5.40	...	5.40	5.94	7.85	5.10	5.35	6.55
Balt. (city)....	5.46	6.36	6.81	5.52	...	5.57	6.31	...	5.51	5.71	7.16
Balt. (c'try)...	5.31	6.21	6.66	5.37	...	5.42	6.16	...	5.36	5.56	7.01
Norfolk, Va. ..	5.80†	...	...	...	...	6.05	7.05	...	6.05	6.05	7.55
Wash. (w'hse).	6.07†	...	...	5.83	...	5.88	6.62	...	5.82	6.02	7.47
Buffalo (del.)..	5.00†	5.90	7.57	5.39	6.42	5.10	5.60	10.13	5.15	5.50	7.06
Buffalo (w'hse)	4.85†	5.75	7.42	5.24	6.27	4.95	5.40	9.60	5.00	5.35	6.91
Pitts. (w'hse) ..	4.85	5.75**	6.80	5.00	6.00	4.90	5.40	9.20††	4.90	5.05	6.55
Detroit (w'hse)	5.32	6.22**	7.35	5.42	6.42-6.73	5.43	5.90	8.44-8.59	5.48	5.67	7.02
Cleveland (del.)	5.00	5.90	6.80-6.85	5.15-5.18	6.15	5.15-5.16	5.60	7.84-8.00	5.15-5.16	5.35-5.36	6.80-6.81
Cleve. (w'hse).	4.85	5.75	6.65-6.70	5.00-5.03	6.00	5.00-5.01	5.45	7.84-7.85	5.00-5.01	5.20-5.21	6.65-6.66
Cincin. (w'hse).	5.26†	5.94**	6.83	5.38	6.10	5.43	5.94	...	5.43	5.63	7.03
Chicago (city) 5.00-5.20†	5.90†	7.00	5.00	6.67-6.83	5.05	5.60	7.85*	...	5.05	5.25	6.70
Chicago (w'hse) 4.85-5.05†	5.75*	6.85	4.85	6.52-6.68	4.90	5.40	7.70*	...	4.90	5.10	6.55
Milwaukee (city) 5.18-5.38†	6.08*	7.18	5.18	6.82-7.01	5.23	5.78	8.03*	...	5.23	5.43	6.88
St. Louis (del.)	5.37	6.27*	7.44	5.34	6.64	5.39	6.19*	6.64	5.39	5.59	7.04
St. L. (w'hse)...	5.22	6.12*	7.29	5.19	6.49	5.24	6.04*	6.49	5.24	5.44	6.89
Birm'ham (city)	5.00	5.90	6.55	5.00	...	5.00	6.83	...	5.05	5.25	7.69
Birm'ham (c'try)	4.85	5.75	6.40	4.85	...	4.85	6.68	...	4.90	5.10	7.54
Omaha, Nebr...	6.13†	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	6.60	8.05**	7.95	6.80	9.50	6.25	8.20	...	6.10	6.30	8.20
L. A. (w'hse)...	6.45	7.90**	7.80	6.65	9.35	6.10	8.05	...	5.95	6.15	8.05
San Francisco..	6.15†	7.50*	8.10	6.75†	8.25*	5.90†	7.55	10.85*	5.90	6.35	8.10
Seattle-Tacoma.	6.70†	8.15*	8.80	6.70†	...	6.20†	8.15*	10.35	6.00†	6.35†	8.40†

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; ** 17 gage; †† as annealed.

Base quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 1000 lb and over; galvanized sheets, 450 lb to 1499 lb; 1—1500 lb and over; 2—1000 to 4999 lb; 3—450 to 1499 lb; 4—400 to 1499 lb; 5—1000 to 1999 lb; 6—1000 lb and over; 7—300 to 9999 lb; 8—1500 to 1999 lb; 9—400 to 3999 lb; 10—400 lb and over; 11—500 to 1499 lb.

PRICES OF LEADING FERROALLOY PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, \$65, Palmerton, Pa.; \$66, Pittsburgh and Chicago; (16% to 19% Mn) \$1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk \$172 per gross ton of alloy, c.l. packed, \$184; gross ton lots, packed, \$199; less gross ton lots, packed, \$216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: \$174, f.o.b. Birmingham and Johnstown, Pa., furnaces; \$172, Sheridan, Pa.; \$175, Etina, Pa. Shipment from Pacific Coast warehouses by one seller add \$33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Ore. Shipment from Chicago warehouse, ton lots, \$214; less gross ton lots, \$231 f.o.b. Chicago. Add or subtract \$2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Manganese, Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17.5%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr, c.l., packed

21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lot 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max. 0.50% C grade, \$1.03 per lb of contained chromium, ton lot \$1.05, less ton \$1.07. Delivered. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si; packed 19.90-21.70c; ton lot 21.00-22.60c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices. **75% Ferrosilicon:** Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15c per lb of contained Si, carload

packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices. **90-95% Ferrosilicon:** Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe) C.l., lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alisifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.40c per lb of alloy, ton lots packed 8.80c, 200 to 1999 lb 9.15c, smaller lots 9.65c. Delivered. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk, 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdenum Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

(Please turn to page 138)

Metals Stockpiling Program Lags

Government purchases for permanent reserve delayed pending determination of possible cutback in military funds and congressional action on revision in buying policies

New York—Buying of major nonferrous metals was on a moderate scale last week. Interest in zinc spurred immediately following the advance of $\frac{1}{2}$ -cent to the basis of 9.50c, East St. Louis, on July 18, but sellers were able to cover inquiry fully at that level by the weekend.

Absence of government purchases for stockpiling needs has been a disappointing development. Demand for this purpose had been expected to be a strong factor in stabilizing the markets and should make itself felt again soon.

Munitions Board officials reported last week that 59 per cent of the dollar value of copper, lead, zinc, vanadium, cadmium, bismuth, and mercury, would be purchased from domestic sources under the new stockpiling program if the board finds it possible to follow the historical pattern of such purchases.

Officials of the board told the House Public Lands Committee last week that 19.5 per cent of the dollar value of all materials purchased for the stockpile probably would be obtained from domestic sources, if the historical pattern is followed. The committee is attempting to determine approximate amounts of domestic metals and minerals that the Munitions Board might purchase if a presidential directive were issued to increase procurement of domestic materials.

It was brought out in the hearing that all purchases of copper, lead, zinc and other metals can not be made domestically because of foreign commitments.

No directive has been received by the Bureau of Federal Supply from the Munitions Board for the purchase of metals and minerals under present appropriations. The directive has not been issued pending determination of a possible cutback in military funds, now under consideration by the Senate Appropriations Committee.

As another phase in the formation of the government's stockpiling program, the House group representing western mining interests is expected to ask the Munitions Board to earmark from \$500 million to \$600 million of the \$840 million in stockpiling funds now available for domestic purchases. The Munitions Board is expected to offer to purchase a compromise amount.

Copper—Demand for copper has receded from the level which prevailed just prior to and immediately following the advance in prices to the basis of 17.62 $\frac{1}{2}$ c, Connecticut, on July 11. Only a moderate amount of business was booked last week. Brass mills are stepping up operations gradually following vacation shutdowns and some of them report that their orders have improved. However, some mills will reduce their stocks of raw materials further

before re-entering the market for substantial tonnages of copper. Reflecting the inactivity, red metal scrap prices have declined fractionally.

Lead—Deliveries of lead this month are expected to show a substantial gain over those in June, which were the largest in months. All tonnages available for sale are being disposed of daily, generally on an average price basis, and waiting lists are being built up in some instances. Battery makers are stepping up operations and are expected to continue to make large demands for lead over the next few weeks. Some sellers are booked well into August, giving the market a strong undertone at the present level of 13.80c to 13.85c, St. Louis, for the common grade.

Zinc—Producers advanced prices $\frac{1}{2}$ -cent a pound on July 18 to the basis of 9.50c, East St. Louis, for prime western. This advance was the first upward revision since the downtrend in prices started in mid-March and had been delayed pending outcome of negotiations to avert a threatened steel strike on July 16. When it was determined that galvanizers would continue to consume large tonnages of zinc, producers revised prices to meet the heavy pent-up demand. All sellers reported initial heavy bookings at the new prices and a general easing in pressure as the week progressed.

Producers of allied products, such as zinc sheet, strip, plates, zinc dust, etc., made proportionate increases in the prices of their products.

Tin—Stocks of primary pig tin, plus tin content of concentrates in the United States, on June 30 are estimated by the leading trade authority here to approximate 118,000 tons, or the equivalent to two years' essential requirements. Stocks of pig tin were estimated at 100,200 tons as follows: RFC stock, 33,700 tons; in permanent stockpile, 54,500 tons; and consumers' stocks, 12,000 tons. Stocks of concentrates were estimated at 18,000 tons of tin content. This trade authority estimates that stocks in the United States will increase between 20,000 and 25,000 tons during the second half of this year and that the permanent stockpile will amount to about 85,000 tons by the yearend.

Reconstruction Finance Corp. has not yet made any purchases of pig tin against the first interim allocation of 17,100 tons accorded this country by the Combined Tin Committee for the second half of 1949.

Reynolds' Cable Output Gains

Louisville, Ky.—Current shipments of aluminum conductor (ACSR) by Reynolds Metals Co., this city, are now exceeding the anticipated 2 mil-

lion pounds per month rate originally set up as the goal for the remainder of 1949. In announcing that the five millionth pound of conductor was shipped June 30, David P. Reynolds, sales vice president, said the company's cable production is now in high gear. "Our first reel was delivered on Apr. 8," he said, "and the first carload went out on Apr. 15, just 90 days after we signed an agreement to supply cable, and 256 days ahead of original schedule."

Tin, Terne Plate Output

Washington—Tin consumed for tin plate and terne plate increased on 2 per cent, whereas tin plate and terne plate production increased 1 per cent in 1948 to establish a new record high according to the Bureau of Mines.

Tin used for terne plate increased 34 per cent. The tonnage output of short ternes almost doubled, whereas the output of long ternes decreased 4 per cent compared with 1947.

For the first time in history electrolytic tin plate production exceeded that of hot-dipped tin plate. The tin plate output was 4 per cent greater than in 1947, the previous record year, but since electrolytic tin plating requires less tin, industry demand for this metal did not increase in proportion to the output of plate. Of the total tin plate produced in 1948, electrolytic lines accounted for 51 per cent (48 per cent in 1947), and hot-dipped operations accounted for 49 per cent (52 per cent in 1947). Hot-dipped tin plate has been used chiefly to make sanitary or packers' cans, while about 9 per cent of electrolytic tin plate has been divided between general line and sanitary cans, and also a sizable tonnage for closures and crowns.

Demand for cans of all kinds increased 10 per cent in 1948. The greatest portion of all cans produced is for the food pack, which use increased 8 per cent. Use for packing nonfood products increased 15 per cent.

Exports of tin cans increased 4 per cent, and were 40,824 short tons in 1948 compared with 29,189 short tons in 1947. Tin plate exports declined slightly from the high level attained in 1947.

Lists Silver Rivet Prices

North Chicago, Ill.—Fansteel Metallurgical Corp., this city, has issued a stock list showing 60 standard sizes of solid fine silver electrical contact rivets. Included in the list are flat and radius faced rivets with head diameters ranging from 0.093 to 0.25 in., with shank diameters and lengths suitable for most assembly requirements. Copies of the list are supplied without charge upon request.

Revere Ware Line Expanded

New York—Revere Copper & Brass Inc., this city, has announced addition of a complete line of preserving kettles and two new sizes in sauce pots to its offerings of copper-clad stainless-steel products.

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted)

Copper: Electrolytic 17.62½¢, Conn. Valley; Lake, 17.75¢, Conn. Valley.

Brass Ingot: 85-5-5 (No. 115) 14.25-16.00¢; 88-10-2 (No. 215) 24.00¢; 80-10-10 (No. 305) 20.50¢; No. 1 yellow (No. 405) 12.00-13.75¢.

Zinc: Prime western 9.50¢, brass special 9.75¢, intermediate 10.00¢, East St. Louis; high grade 10.50¢, delivered.

Lead: Common 13.80-13.85¢; chemical, 13.90¢; corrodng, 13.90-13.95¢, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00¢, pigs 16.00¢. Base prices for 10,000 lb and over, f.o.b. shipping point.

Secondary Aluminum: Piston alloys 15.50-14.50-15.00¢; steel deoxidizing grades, notch bars, granulated or shot; Grade 1, 15.50-15.75¢; grade 2, 14.75-15.25¢; grade 3, 13.75-14.25¢; grade 4, 13.00-13.25¢. Prices include freight at carload rate up to 75 cents per 100 lb.

5% titanium-aluminum alloy No. 1 (low Cu) 31.00¢; No. 2 (2% Cu) 28.00¢, f.o.b. Eddy-stone, Pa.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50¢, f.o.b. Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) \$1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, \$1.028; grade C, 99.85-99.79%, incl. \$1.024; 99.5-99.64% \$1.024, grade F, 98-98.999% \$1.015 for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American 99-99.8% and over but not meeting specifications below, 38.50¢; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 39.00¢, f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00¢; 25-lb pigs, 42.50¢; "XX" nickel shot, 43.50¢; "F" nickel shot or ingots, for addition to cast iron, 40.50¢. Prices include import duty.

Mercury: Open market, spot, New York \$79-\$83 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, \$24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, \$2 del.; special or patented shapes, \$2.15.

Cobalt: 97-98%, \$1.80 per lb for 550 lb (keg); \$1.82 per lb for 100 lb (case); \$1.87 per lb under 100 lb.

Gold: U. S. Treasury, \$35 per ounce.

Silver: Open market, New York, 71.50¢ per ounce.

Platinum: \$69-\$72 per ounce.

Palladium: \$24 per troy ounce.

Iridium: \$100-\$110 per troy ounce.

Titanium (sponge form): \$5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 16-cent copper.)

Sheet: Copper 31.30; yellow brass 27.85; commercial bronze, 95%, 31.23; 90%, 30.74; red brass, 85%, 29.74; 80%, 29.27; best quality, 28.73; nickel silver, 18%, 41.57; phosphor-bronze, grade A, 5%, 50.47.

Rods: Copper, hot rolled 27.15; cold drawn 28.40; yellow brass, free cutting, 22.37; commercial bronze, 95% 30.92; 90% 30.43; red brass 85% 29.43; 80% 28.96.

Seamless Tubing: Copper 31.34, yellow brass 30.86; commercial bronze 90% 33.40; red brass 85% 32.65; 80% 32.18.

Wire: Yellow brass 28.14; commercial bronze, 95% 31.52; 90% 31.03; red brass, 85% 30.03; 80% 29.56; best quality brass 29.02.

Copper Wire: Bare soft, f.o.b., eastern mills, 100,000 lb lots, 23.42½, l.c.l. 24.05, c.l. 23.55; weatherproof, f.o.b. eastern mills, 100,000 lb lots, 25.193, l.c.l. 25.943, c.l. 25.443; magnet, delivered, c.l. 27.62½, 15,000 lb or more 27.87½, l.c.l. 28.37½.

ALUMINUM

Thickness Range, Inches	Widths or Diameters, Sheet In., Incl. Base*	2s and 3S mill finish c.l.	
		Coiled Sheet Circle† Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...
0.135-0.096	12-48	27.4	...
0.095-0.077	12-48	27.9	26.0
0.076-0.068	12-48	28.5	26.2
0.067-0.061	12-48	28.5	26.2
0.060-0.048	12-48	28.7	26.4
0.047-0.038	12-48	29.1	26.6
0.037-0.030	12-48	29.5	27.0
0.029-0.024	12-48	29.9	27.3
0.023-0.019	12-36	30.5	27.7
0.018-0.017	12-36	31.1	28.3
0.016-0.015	12-36	31.8	28.9
0.014	12-24	32.7	29.7
0.013-0.012	12-24	33.6	30.4
0.011	12-24	34.6	31.3
0.010-0.0095	12-24	35.6	32.3
0.009-0.0085	12-20	36.8	33.4
0.008-0.0075	12-20	38.1	34.6
0.007	12-18	39.5	35.9
0.006	12-18	41.0	37.2

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (In.) or distance across flats	Round—		Hexagonal—	
	R317-T4, 17S-T4	R317-T4	17S-T4	17S-T4
0.125	48.0	...	...	...
0.156-0.203	41.0	...	...	...
0.219-0.313	38.0	...	...	...
0.344	37.0	...	...	47.0
0.375	36.5	45.5	44.0	...
0.406	36.5	...	...	...
0.438	36.5	45.5	44.0	...
0.469	36.5	...	...	...
0.500	36.5	45.5	44.0	...
0.531	36.5	...	...	...
0.563	36.5	...	...	41.5
0.594	36.5	...	...	...
0.625	36.5	43.0	41.5	...
0.656	36.5	...	...	...
0.688	36.5	...	...	41.5
0.750-1.000	35.5	40.5	39.0	...
1.063	35.5	...	...	37.5
1.125-1.500	34.5	39.0	37.5	...
1.563	34.5	...	...	37.5
1.625	33.5	...	...	36.5
1.888-2.000	33.5	...	...	...
2.125-2.500	32.5	...	...	...
2.625-3.375	31.5	...	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh: Sheets: Full rolls, 140 sq ft or more, \$19.00 per cwt; add 50¢ per cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, \$19.00 per cwt. Traps and Bends: List price plus 50%.

ZINC

Sheets, 14.50¢, f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 13.50¢, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 12.50¢; over 12-in., 13.50¢.

NICKEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled, 60.00¢. Strip, cold-rolled 66.00¢. Rods and shapes, 56.00¢. Plates 58.00¢. Seamless tubes, 89.00¢.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00¢; Strip, cold-rolled, 50.00¢. Rods and shapes, 45.00¢. Plates, 46.00¢. Seamless tubes, 80.00¢. Shot and blocks, 40.00¢.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00¢; 25 to 99 lb, 42.00-46.00¢; 100 lb to 4000 lb, 35.00-36.00¢.

Plating Materials

Chromic Acid: 99.9%, flake, f.o.b. Philadelphia, carloads, 26.00¢; 5 tons and over 26.50¢; 1 to 5 tons, 27.00¢; less than 1 ton, 27.50¢.

Copper Anodes: Base, 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat untrimmed 27.96¢; oval 27.46¢; cast 25.99¢.

Copper Cyanide: 70-71% Cu, 100-lb drums, 48.00¢, f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00¢; 1000 to 19,900 lb, 17.00¢, f.o.b. Niagara Falls, N. Y.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 26.25¢; over 250 lb, 25.25¢, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00¢; 10,000 to 30,000 lb, 57.00¢; 3000 to 10,000 lb, 58.00¢; 500 to 3000 lb, 59.00¢; 100 to 500 lb, 61.00¢; under 100 lb, 64.00¢; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 26.50¢; 400-lb bbl, 24.50¢, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over, 119.00¢; 500 to 999 lb, 119.50¢; 200 to 499 lb, 120.00¢; less than 200 lb, 121.50¢; ball, 1000 lb and over, 121.25¢; 500 to 999 lb, 121.75¢; 200 to 499 lb, 122.25¢; less than 200 lb, 123.75¢ f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 71.8¢; 100 or 300 lb drums only, 100 to 500 lb, 63.6¢; 600 to 1900 lb, 61.2¢; 2000 to 9900 lb, 59.4¢, f.o.b. Sewaren, N. J. On 100 or 350 lb drums only, 160 to 600 lb, 63.3¢; 700 to 1900 lb, 60.9¢; 2000 to 9900 lb, 59.1¢; 10,000 lb and over, 58.00¢, f.o.b. Carteret, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100-lb drums 42.50¢, f.o.b. Cleveland; 43.00¢, Detroit; 42.00¢, Philadelphia.

Stannous Sulphate: Less than 2000 lb in 100 lb kegs, 100.00¢, in 400 lb bbl, 99.00¢; more than 2000 lb, in 100 lb kegs, 99.00¢, in 400 lb bbl, 98.00¢, f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, 97.00¢; 100 lb kegs, 98.00¢, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb f.o.b. shipping point.

	Clean	Rod	Clean
	Heavy	Ends	Turnings
Copper	14.62½	14.62½	13.87½
Yellow brass	11.62½	11.37½	10.62½
Commercial Bronze			
95%	13.62½	13.37½	12.87½
90%	13.37½	13.12½	12.62½
Red Brass			
85%	13.12½	12.87½	12.37½
80%	12.75	12.50	12.00
Best Quality (71-80%)	12.62½	12.37½	11.87½
Muntz Metal	10.75	10.50	10.00
Nickel, silver, 10% ..	13.75	13.50	6.87½
Phos. bronze, A.....	16.37½	16.12½	15.12½
Naval brass	11.25	11.00	10.50
Manganese bronze ..	11.25	11.00	10.37½

BRASS INGOT MAKERS

BUYING PRICES

(Cents per pound, f.o.b. shipping point, carload lots)

No. 1 copper 13.75-14.00, No. 2 copper 12.75, light copper 11.75, composition red brass 10.00-10.25; refiners 8.75, heavy yellow brass 8.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 13.75-14.00, No. 2 copper 12.75-13.00, light copper 11.75-12.00, refinery brass (60% copper) per dry copper content 11.00-11.25.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and Brass: Heavy copper and wire No. 1 12.00-12.25, No. 2 11.00-11.25, light cop 13.00, light copper 11.75-12.00, refinery brass per 9.75-10.25, No. 1 composition red brass 8.50-8.75, No. 1 composition turnings 8.25-8.50, mixed brass turnings 5.25-5.50, new brass clippings 9.75-10.25, No. 1 brass rod turnings 7.25-7.50, light brass 5.25-5.50, heavy yellow brass 5.75-6.00, new brass rod ends 7.25-7.50, auto radiators, unsweated 7.00-7.25, cocks and faucets, 7.00-7.25, brass pipe 7.00-7.25.

Lead: Heavy 9.50-10.00, battery plates 6.00-6.25, linotype and stereotype 10.25-10.50, electrolyte 9.00-9.50, mixed babbitt 11.25-11.75, solder joints, 12.50-13.00.

Zinc: Old zinc 3.00-3.50, new die cast scrap 3.00-3.50, old die cast scrap 2.00.

Tin: No. 1 pewter 52.00-54.00, block tin pipe 70.00-72.00, No. 1 babbitt 40.00-42.00.

Aluminum: Clippings 2S 9.50-10.00, old sheets 5.50-6.00, crankcase 5.50-6.00, borings and turnings 3.00-3.50, pistons, free of struts, 5.50-6.00.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	timony	Nickel	Silver
June Avg.	18.606	11.850	9.548	103.000	17.000	38.500	40.000	71.500
May Avg.	18.045	13.566	11.880	103.000	17.000	38.500	40.000	71.500
Apr. Avg.	21.774	15.017	14.085	103.000	17.000	38.500	40.000	71.500
July 1-5..	16.00	11.85	9.00	103.00	17.00	38.50	40.00	71.50
July 6-7..	17.00	11.85	9.00	103.00	17.00	38.50	40.00	71.50
July 8-9..	17.00	12.85	9.00	103.00	17.00	38.50	40.00	71.50
July 11..	17.62½	12.85	9.00	103.00	17.00	38.50	40.00	71.50
July 12..	17.62½	13.35	9.00	103.00	17.00	38.50	40.00	71.50
July 13-16	17.62½	13.80-13.85	9.00	103.00	17.00	38.50	40.00	71.50
July 18-21	17.62½	13.80-13.85	9.50	103.00	17.00	38.50	40.00	71.50

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt,	\$21.00
No. 2 Heavy Melt,	19.00*
No. 1 Busheling,	21.00
No. 2 Bundles,	21.00
No. 3 Bundles,	17.00-17.50*
Heavy Turnings,	16.50-17.00*
Machine Shop Turnings,	12.50-13.00†
Mixed Borings, Turnings,	12.50-13.00†
Short Shovel Turnings,	16.50-17.00*
Cast Iron Borings,	17.00-17.50
Bar Crops and Plate,	21.00-21.50
Low Phos. Steel,	23.00-23.50

Cast Iron Grades†

No. 1 Cupola Cast,	22.00-22.50
No. 1 Machinery Cast,	27.00-27.50
Charging Box Cast,	21.00-21.50
Heavy Breakable Cast,	20.00-20.50
Brake Shoe,	21.00-21.50

Railroad Scrap

No. 1 R.R. Heavy Melt,	22.00
Axles,	23.50-24.00
Rails, Random Lengths,	22.00-22.50†
Rails, 2 ft and under,	26.00-26.50
Rails, 18 in. and under,	27.00-27.50
Railroad Specialties,	24.00-24.50
Angles, Splice Bars,	23.00-23.50

*Nominal.

†Brokers' buying prices.

‡Crushers' buying prices.

CLEVELAND

Heavy Melt, Steel,	\$14.50-15.50
No. 1 Busheling,	14.50-15.50
No. 2 Bundles,	12.50-13.50
Machine Shop Turnings,	8.50-9.50
Mixed Borings, Turnings,	14.00-14.50
Short Shovel Turnings,	14.00-14.50
Heavy Turnings,	19.00
Cast Iron Borings,	14.00-14.50
Bar Crops and Plate,	16.00-17.00
Punchings & Plate Scrap,	15.00-17.00
Cut Structural,	17.00-18.00

Cast Iron Grades†

No. 1 Cupola,	25.50-26.50
Charging Box Cast,	20.50-21.50
Stove Plate,	19.50-20.50
Heavy Breakable Cast,	17.50-18.50
Unstripped Motor Blocks,	16.50-17.50
Malleable,	19.50-20.50
Brake Shoes,	18.50-19.00
Clean Auto Cast,	28.00-29.00
No. 1 Wheels,	22.00-23.00
Burnt Cast,	16.50-17.50

Railroad Scrap

No. 1 R.R. Heavy Melt,	21.00-22.00
R.R. Malleable,	21.00-22.00
Rails, 3 ft and under,	26.00-27.00
Rails, Random Lengths,	24.00-25.00
Cast Steel,	22.00-23.00
Railroad Specialties,	22.00-23.00
Uncut Tires,	23.00
Angles, Splice Bars,	26.00

† Nominal.

VALLEY

Heavy Melt, Steel,	\$18.50
No. 1 Bundles,	18.50
No. 2 Bundles,	15.50
Machine Shop Turnings,	10.00-10.50
Short Shovel Turnings,	16.00-17.00
Cast Iron Borings,	16.00-17.00
Low Phos.	19.50-20.00

Railroad Scrap

No. 1 R.R. Heavy Melt,	20.50-21.00
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MANSFIELD

Machine Shop Turnings,	\$10.00-10.50
Short Shovel Turnings,	14.00-14.50

CINCINNATI

No. 1 Heavy Melt, Steel,	\$18.00
No. 2 Heavy Melt, Steel,	17.00
No. 1 Busheling,	17.00
No. 1 Bundles,	18.00
No. 2 Bundles,	16.00
Machine Shop Turnings,	8.00
Mixed Borings, Turnings,	8.00
Short Shovel Turnings,	8.00
Cast Iron Borings,	9.00

Cast Iron Grades

No. 1 Cupola Cast,	27.00
Charging Box Cast,	21.00
Heavy Breakable Cast,	18.00
Stove Plate,	15.00
Unstripped Motor Blocks,	15.00
Brake Shoes,	15.00
Clean Auto Cast,	27.00
Drop Broken Cast,	28.00

Railroad Scrap

No. 1 R.R. Heavy Melt,	20.00
R.R. Malleable,	17.00
Rails, Rerolling,	21.00
Rails, Random Lengths,	19.00
Rails, 18 in. and under,	28.00

DETROIT

(Brokers' buying prices,
f.o.b. shipping point)

No. 1 Bundles,	\$14.50-15.00
No. 2 Bundles,	11.00-11.50
No. 2 Heavy Melt, Steel,	11.50-12.00
No. 1 Busheling,	14.50-15.00
Machine Shop Turnings,	8.00-8.50
Mixed Borings, Turnings,	8.00-8.50
Short Shovel Turnings,	9.50-10.00
Cast Iron Borings,	9.50-10.00
Punchings & Plate Scrap,	14.50-15.00

Cast Iron Grades

No. 1 Cupola Cast,	21.00-22.00
Heavy Breakable Cast,	17.00-18.00
Clean Auto Cast,	21.00-22.00

BUFFALO

No. 1 Heavy Melt, Steel,	\$19.00-19.50
No. 2 Heavy Melt, Steel,	16.00-16.50
No. 1 Bundles,	16.00-16.50
No. 1 Bushelings,	16.00-16.50
No. 2 Bundles,	14.00-14.50
Machine Shop Turnings,	10.00-10.50
Mixed Borings, Turnings,	13.50-14.00
Cast Iron Borings,	13.50-14.00
Short Shovelings,	13.50-14.00
Low Phos.	19.50-20.50

Cast Iron Grades

No. 1 Cupola,	22.00-23.00
Mixed Yard,	20.00-21.00
Heavy Breakable,	17.00-18.00
Malleable,	19.00-19.50
Clean Auto Cast,	22.00-22.50

Railroad scrap

Rails 3 ft. and under,	26.00-27.00
Scrap rails,	21.00-22.00
Specialties,	23.00-24.00

PHILADELPHIA

No. 1 Heavy Melt, Steel,	\$17.00
No. 2 Heavy Melt, Steel,	16.00
No. 1 Busheling,	17.00
No. 1 Bundles,	17.00
No. 2 Bundles,	14.50-15.00
Machine Shop Turnings,	10.50-11.00
Short Shovel Turnings,	13.00-13.50
Mixed Borings, Turnings,	10.00-10.50
Bar Crop and Plate,	20.00-21.00
Punchings & Plate Scrap,	21.00-22.00
Cut Structural,	29.00-21.00
Elec. Furnace Bundles,	17.00
Heavy Turnings,	17.00
No. 1 Chemical Borings,	Nom.

Cast Iron Grades

No. 1 Cupola Cast,	24.00
No. 1 Machinery Cast,	26.00-27.00
Charging Box Cast,	23.00-24.00
Heavy Breakable Cast,	23.00-24.00
Unstripped Motor Blocks,	18.00-19.00
Clean Auto Cast,	26.00-27.00
No. 1 Wheels,	26.00-27.00

NEW YORK

(Brokers' buying prices f.o.b.
shipping point)

No. 1 Heavy Melt, Steel,	\$11.00-11.50
No. 2 Heavy Melt, Steel,	10.00-10.50
No. 1 Busheling,	10.00-10.50
No. 1 Bundles,	11.50-12.50
No. 2 Bundles,	9.00-9.50
No. 3 Bundles,	nominal
Machine Shop Turnings,	4.00-4.50
Mixed Borings, Turnings,	4.00-4.50
Short Shovel Turnings,	5.00-8.00
Punchings & Plate Scrap,	15.00

Cut Structural nominal
Elec. Furnace Bundles. 17.00

Cast Iron Grades

No. 1 Cupola Cast,	19.00-20.00
No. 1 Machinery,	20.00-21.00
Charging Box Cast,	17.00-17.50
Heavy Breakable,	17.00-17.50
Unstripped Motor Blocks,	nom.
Malleable,	nom.

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt, Steel,	\$9.50
No. 2 Heavy Melt, Steel,	8.50-9.00
No. 1 Bundles,	9.50
No. 1 Busheling,	8.00-8.50
Machine Shop Turnings,	5.00-5.50
Mixed Borings, Turnings,	4.50-5.00
Short Shovel Turnings,	6.00-6.50
Bar Crops and Plate,	11.00-12.00
Punchings & Plate Scrap,	11.00-12.00
Chemical Borings,	10.50-11.00

Cast Iron Grades

No. 1 Cupola Cast,	19.00-20.00
Mixed Cast,	18.00-19.00
Heavy Breakable Cast,	17.00-18.00
Stove Plate,	18.00-19.00
Unstripped Motor Blocks,	16.00-17.00

CHICAGO

No. 1 Heavy Melt, Steel,	\$19.00-20.00
No. 2 Heavy Melt, Steel,	17.00-18.00
No. 1 Bundles,	19.00-20.00
No. 2 Bundles,	15.00-16.00
No. 3 Bundles,	12.00-13.00†
Machine Shop Turnings,	11.00-12.00
Mixed Borings, Turnings,	9.00-10.00
Short Shovel Turnings,	13.00-14.00
Cast Iron Borings,	12.00-13.00
Bar Crops and Plate,	19.00-20.00†
Punchings,	19.00-20.00†
Elec. Furnace Bundles,	19.00-20.00†
Heavy Turnings,	17.00-18.00
Cut Structural,	20.00-21.00

Cast Iron Grades

No. 1 Cupola Cast,	29.00-30.00
Clean Auto Cast,	28.00-29.00
No. 1 Wheels,	27.00-28.00

Railroad Scrap

No. 1 R.R. Heavy Melt,	20.00-21.00
Malleable,	22.00-23.00†
Rails, Rerolling,	27.50-28.00
Rails, Random Lengths,	22.00-23.00
Rails, 2 ft. and under,	28.00-29.00
Rails, 18 in. and under,	29.00-30.00
Railroad Specialties,	23.00-24.00
Angles, Splice Bars,	23.00-24.00

†Nominal

ST. LOUIS

No. 1 Heavy Melt, Steel,	\$18.00-19.00
No. 2 Heavy Melt, Steel,	17.00-18.00
Machine Shop Turnings,	9.00-11.00
Short Shovel Turnings,	9.00-11.00

Cast Iron Grades

No. 1 Cupola Cast,	24.00-25.00
Charging Box Cast,	20.00-22.00
Heavy Breakable Cast,	19.00-20.00
Brake Shoes,	19.00-20.00
Clean Auto Cast,	28.00-29.00
Burnt Cast,	20.00-21.00

Railroad Scrap

R. R. Malleable,	19.00-20.00
Rails, Rerolling,	25.00-26.00
Rails, Random Lengths,	21.00-22.00
Rails, 3 ft. and under,	25.00-26.00
Uncut Tires,	18.00-19.00
Angles, Splice Bars,	24.00-25.00

BIRMINGHAM

No. 1 Heavy Melt, Steel,	\$18.00
No. 2 Heavy Melt, Steel,	16.00
No. 1 Busheling,	16.00
No. 2 Bundles,	14.00
Machine Shop Turnings,	13.00
Mixed Borings, Turnings,	14.00
Short Shovel Turnings,	15.00
Cast Iron Borings,	15.00
Bar Crops and Plate,	23.00
Cut Structural,	23.00

Cast Iron Grades

No. 1 Cupola Cast,	28.00
Stove Plate,	20.00
No. 1 Wheels,	17.00-18.00

STEELMAKING SCRAP
COMPOSITE

July 23,	\$19.17
July 16,	19.17
June 1949,	20.85
July 1948,	41.43
July 1944,	19.17

Based on No. 1 heavy melting
grade at Pittsburgh, Chicago
and eastern Pennsylvania.

Railroad Scrap

No. 1 R.R. Heavy Melt,	20.00-21.00
R.R. Malleable,	nominal
Rails, Rerolling,	22.50-23.00
Rails, 3 ft. and under,	23.00-24.00
Angles and Splice Bars,	22.00-23.00

SAN FRANCISCO

No. 1 Heavy Melt, Steel,	\$20.00
No. 2 Heavy Melt, Steel,	18.00
Nos. 1 & 2 Bundles,	18.00
Machine Shop Turnings,	12.00

Cast Iron Grades

No. 1 Cupola Cast,	25.00-30.00
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Railroad Scrap

No. 1 R.R. Heavy Melt,	20.00
Wheels,	20.00
Rails, Random Lengths,	20.00

SEATTLE

No. 1 Heavy Melt, Steel,	\$17.00
No. 2 Heavy Melt, Steel,	17.00
No. 1 Bushelings,	15.00
Nos. 1 & 2 Bundles,	15.00
No. 3 Bundles,	15.00
Machine Shop Turnings,	12.00
Mixed Borings, Turnings,	12.00
Punchings & Plate Scrap,	22.00-25.00
Cut Structural,	22.00-25.00
Elec. Furnace Bundles,	25.00

Cast Iron Grades

No. 1 Cupola Cast,	23.00
Heavy Breakable Cast,	17.00
Stove Plate,	17.00
Unstripped Motor Blocks,	17.00
Malleable,	20.00
Brake Shoes,	23.00
Clean Auto Cast,	25.00
No. 1 Wheels,	22.00

Railroad Scrap

No. 1 R.R. Heavy Melt,	18.00
Railroad Malleable,	22.00
Rails, Random Lengths,	18.00
Angles and Splice Bars,	18.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt, Steel,	\$20.00
No. 2 Heavy Melt, Steel,	18.00
Nos. 1 & 2 Bundles,	16.00
No. 3 Bundles,	16.00
Machine Shop Turnings,	12.00
Mixed Borings, Turnings,	12.00
Punchings & Plate Scrap,	26.00
Electric Furnace Bundles,	20.00

Cast Iron Grades

No. 1 Cupola Cast,	27.00
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Railroad Scrap

No. 1 R.R. Heavy Melt,	21.00
Rails, Rerolling,	22.00

HAMILTON, ONT.

(Celling prices, delivered)

Heavy Melt,	\$21.00
No. 1 Bundles,	21.00
Mechanical Bundles,	19.00
Mixed Steel Scrap,	17.00
Mixed Borings, Turnings,	15.00
Rails, Remelting,	21.00
Rails, Rerolling,	24.00
Bushelings,	25.00
Bushelings, new factory, prep'd,	19.00
Bushelings, new factory, unprep'd,	14.00
Short Steel Turnings,	15.00

WE CATER TO THE CHARGER

Efficient production requires high speed in charging furnaces. The small charging doors limit the size and shape of scrap that can be charged. To avoid loss of production time, the charger must have properly prepared scrap with maximum weight per box.

We recognize your problems. One of the principal objectives of our organization is to furnish scrap which will insure maximum production at lowest cost.



CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

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LINCOLN-LIBERTY BLDG.
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Yards

LEBANON, PA. • READING, PA.
DETROIT (ECORSE), MICH.
MODENA, PA. • PITTSBURGH, PA.
ERIE, PA.



BIRMINGHAM, ALA.
Empire Bldg.

BOSTON, MASS.
Statler Bldg.

BUFFALO, N.Y.
Genesee Bldg.

ST. LOUIS, MO.
2110 Railway Exchange Bldg.

CHICAGO, ILL.
100 W. Monroe St.
CLEVELAND, O.
1022 Midland Bldg.

DETROIT, MICH.
2011 Book Bldg.

HOUSTON, TEXAS
803-4-5 Milam Bldg.

LEBANON, PA.
Luria Bldg.

NEW YORK, N.Y.
Woolworth Bldg.

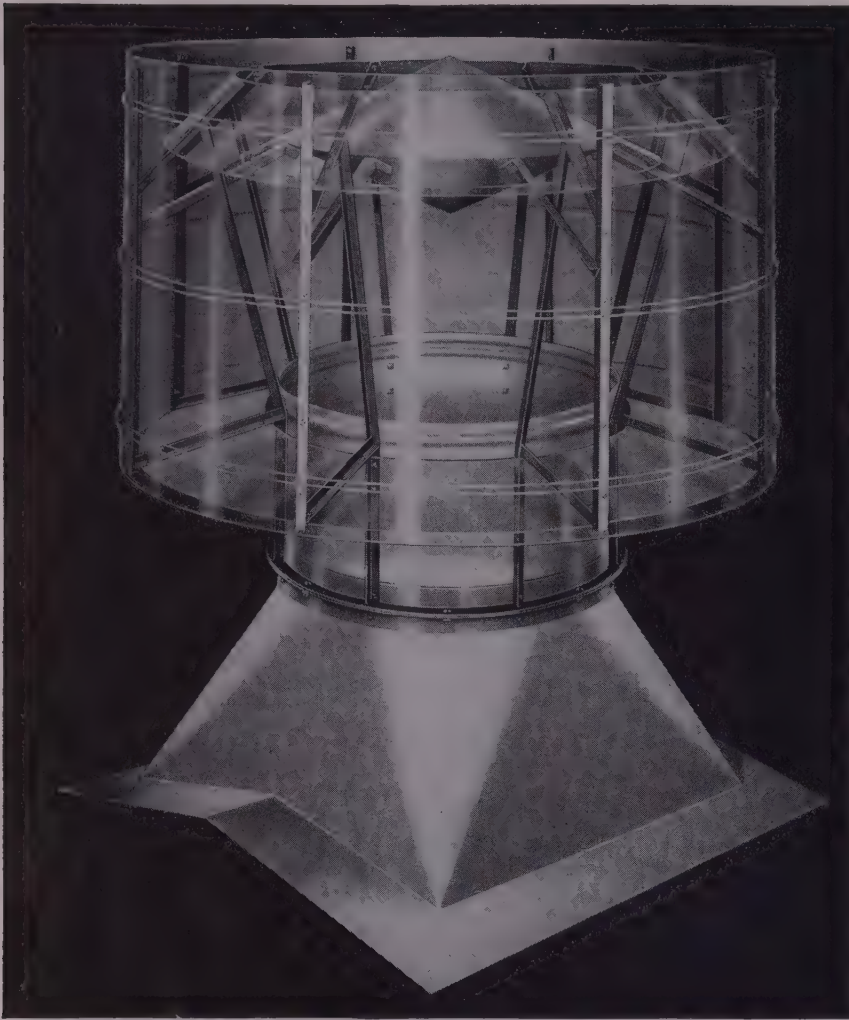
SAN FRANCISCO, CAL.
Pacific Gas & Elec. Co., Bldg.

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READING, PA.
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LEADERS IN IRON AND STEEL SCRAP SINCE 1889



Let Air **MAKE** Money For Your Business

Sweat-blinded workmen can't produce efficiently or safely. Neither can listless workers in logy or fume-filled air. Adequate ventilation, with a Burt Ventilating System, is a profitable investment The complete Burt line of gravity, fan and continuous ridge ventilators includes a size and type for every need. More than half a century of ventilating experience assures you a properly engineered, efficient ventilating system when Burt does the job Burt engineers will gladly help with layouts and specifications—without obligation.

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The **BURT MFG. Co.**

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VENTILATORS - LOUVERS - OIL FILTERS - SHEET METAL SPECIALTIES

Sheets, Strip . . .

Coating extras on galvanized sheets rise \$1.50 a ton following advance in slab zinc price

Sheet Prices, Page 114

Pittsburgh—Large steel purchase in excess of present needs, notably by the automotive industry, as a hedge against threatened steel strike is expected to cause some reduction in forward specification now that the industry is assured of uninterrupted operations for the next 60 days. It is too early to estimate the extent of the anticipated decline in new order volume for there still remains a strike threat Sept. 16. However, there now appears less prospect of a strike than 4 to 6 weeks ago. It appears probable, for example, automotive concerns will not adhere to the regular lead time in placing commitments for September delivery and will attempt to use up excess steel stocks. Some automotive builders are said to have bulk of steel requirements to sustain assembly schedules into September. Another factor in the picture is automotive plant shutdowns for model changeovers. The excess inventory situation is not as serious among electrical appliance and miscellaneous consumers. This group bought relatively little sheet and strip tonnage based on the steel strike threat because of uncertain future production schedules and fact steel stocks already were out of line with projected requirements. In these instances, the inventory retrenchment policy is still being followed, although there are a few scattered signs of buying for replacement purposes at permanent lower levels.

Coating extras applicable to galvanized sheets have been automatically adjusted upward an average of \$1.50 per ton to reflect last week's 1/2-cent per pound advance in zinc.

Chicago—Scramble for steel delivery which occurred while a strike seemed imminent subsided last week and ordering continued to taper. Many in the trade, however, expect an upturn in business, probably in August. Several factors lend support to this belief, outstanding one of which is possibility of a strike in the government fact-finding board's recommendations are unacceptable to either side. Possibility, too, that steel prices, instead of being reduced as virtually all consumers anticipated a month ago, may be forced higher by the granting of wage increases or an expensive pension program also is expected to improve demand for steel. Offsetting these factors, however, is the probability that the automotive industry, which had prepared most completely, inventorywise, for a steel strike, will not see fit to expand its steel stocks further. Estimates have been made that car makers' present steel inventories average six to eight weeks.

Aside from these considerations, encouraging reports were heard last week from a variety of sheet consumers, particularly those in the household appliance line. One local home freezer maker is stepping up operations to a two-turn basis and

OUTDOOR FURNITURE MAKERS Can Relax and Rest Easy



...when their costs are fastened down ... and sales speeded up ... by **AMERICAN PHILLIPS SCREWS**

VACATION FROM COST-WORRY: Assembly costs are controlled ... *fixed and held as much as 50% lower than you ever saw them before* ... when old-fashioned slotted screws are replaced by modern, power-driven American Phillips Screws, the *only* screws with the crossed, *cornerless* recess. Production and product-quality go up as worker-fatigue goes down. And profits flourish as rejects and spoilage all but vanish.

VACATION FROM SALES-WORRY: Customers *don't* like bungled fastenings with ugly, marred surfaces and broken screw-heads that snag clothes. And that's exactly why they *do* like American Phillips-fastened products ... because every fastening is cleanly made and attractive to look at, with never a burred head to spoil sales-appeal. So fasten *your* product with American Phillips Screws ... *and help yourself to double profits.*

AMERICAN SCREW COMPANY, PROVIDENCE 1, RHODE ISLAND

Chicago 11: 589 E. Illinois St.

Detroit 2: 502 Stephenson Building

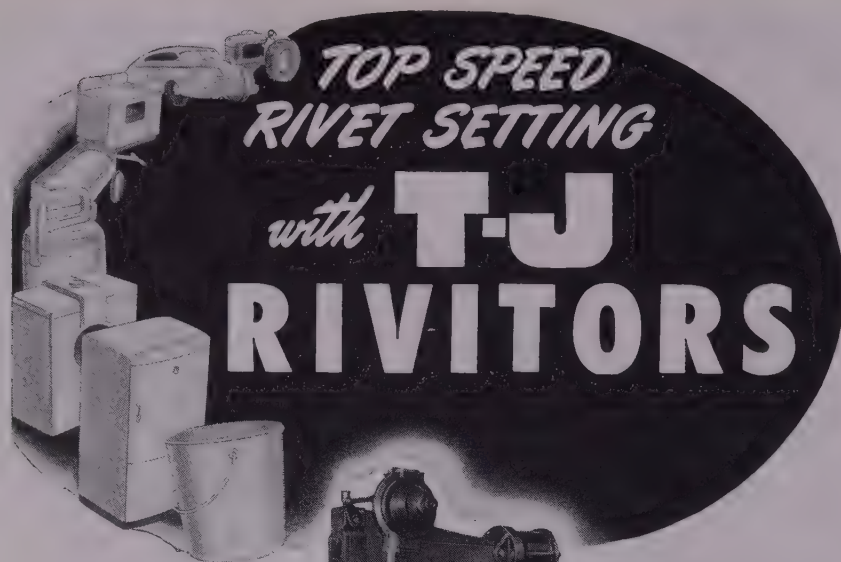
4-WINGED DRIVER CAN'T SLIP OUT
OF PHILLIPS TAPERED RECESS



AMERICAN PHILLIPS *Screws*



ALL TYPES
ALL METALS: Steel, Brass, Bronze, Stainless Steel, Aluminum, Monel, Everdur (silicon bronze)



★ **AUTOMATICALLY
FEEDS AND SETS
SOLID RIVETS!**

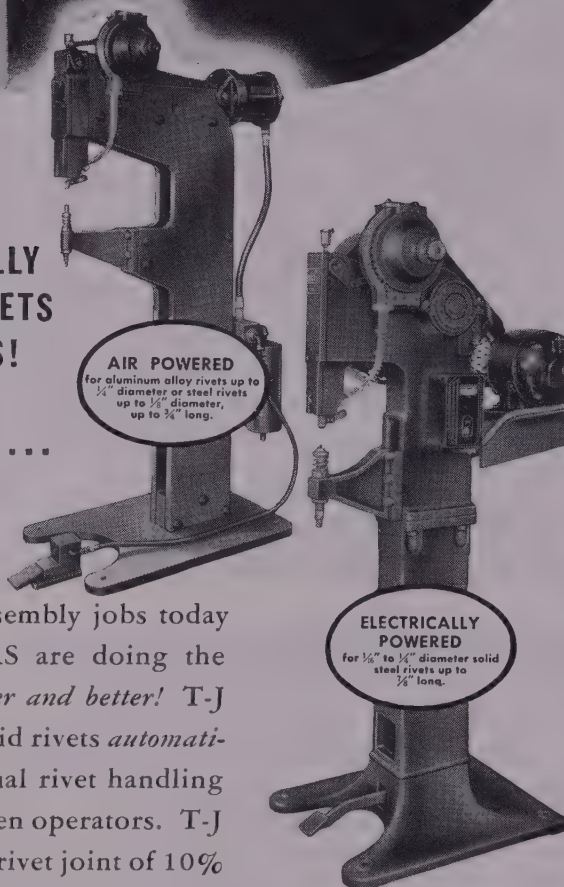
★ **SAVES LABOR...
CUTS COSTS!**

On countless assembly jobs today—T-J RIVITORS are doing the rivet setting *faster and better!* T-J feeds and sets solid rivets *automatically*... no manual rivet handling... easy for women operators. T-J produces a solid rivet joint of 10% to 15% greater strength—a completely filled hole... no flashing... a neat, balanced head. Handles many types of rivets, including counter sunk head, flat head, round head, full and semi brazier head. Sturdily built... trouble-free operation... T-J dependability. Write for bulletin. The Tomkins-Johnson Company, Jackson, Michigan.

32 YEARS EXPERIENCE

T-J

**TOMKINS-JOHNSON
RIVITORS**



has placed sheet orders for August delivery with a district mill. kitchen cabinet maker will have six-day work-week henceforth, it recently having been operating five days. Incidentally, in this field it is reported that four out of five concerns are operating at what the term satisfactory levels at the present time. Two important washing machine makers last week have stepped up output under pressure of growing order backlogs.

Meanwhile, a district producer disclosed that on the whole new steel orders have declined to an abnormally low level but, encouragingly, while cancellations are still high they are not nearly as high as during a month or two ago.

New York—Mills are opening books for fourth quarter, but orders for carbon sheets are not developing volume for that period. More mills are filling September schedules of cold-rolled and one leading producer must have volume confirmed by July 25 for scheduling that month. Galvanized in lighter gages is also difficult to schedule for third quarter. Other grades of flat-rolled, including specialties, are slow with openings for August. Except by the automotive industry there was slight buying as a hedge against a steel strike; automobile builders have been taking in heavy tonnages and some slackening over next 30 days would not be surprising. Already some parts suppliers, ahead of assembly lines, are easing off.

Boston — Flat-rolled inventories have been reduced to a point where replacements would normally be considered, but consumption lags; for lower operations, buying is held for fill-in requirements. Once consumption improves bookings should quickly reflect the trend, but current lack of forward buying is widespread. Some industries will have to show better than a seasonal pick-up to warrant a noteworthy increase in steel purchasing; among these are footwear with holdings of sham steel and tack plate still substantial. Most stamping shops will be looking for flat-rolled with even a moderate increase in orders.

Philadelphia — Cold-rolled sheet schedules for September are about filled with indications producers will be under pressure to roll and ship all tonnage which has accumulated for that month following slack July-August period. Some volume may go over into October. This tightness in cold-finished steel is an exception to other flat-rolled products with the possible exception of light gaged galvanized. Hot-rolled carbon, electrical and stainless deliveries are earlier and there are openings for August in numerous instances. Stocks of semifinished at most mills are somewhat heavier. This tonnage was produced in anticipation of a strike which would have reduced recovery in finishing operations had walkouts occurred.

Cincinnati—Sheet mills in this district are busy on orders for delivery in July, but cautious buying has delayed the filling of the August schedules. Mill interests appear confident, however, that a high level of operations will be maintained. Galvanizing is tight, and cold-rolled is none too

easy. Business in stainless is dull and some of the other sheet specialties are in abundant supply.

Cleveland—Leading sheet producers in this district have sufficient business on their books to sustain operations close to present levels through September. Galvanized sheets and strip are still tight on an allocation basis. Although cold-rolled sheets are on a freer selling basis, this product is also in tight supply.

Great Lakes Steel Corp., Ecorse, Mich., is shipping hot and cold-rolled sheets and coils into this district in competition with local mills. Additional material is being shipped from Detroit warehouses and brokers to cover fill in needs. General Motors Corp.'s Fisher Body plants here are the principal receivers of this material.

Birmingham—Indicative of the continued relative tightness in sheets is disclosure this week that most representative jobbers are still short and unable to supply a demand that has not declined appreciably in many months. Galvanized sheets are sold out for the balance of the year. Strip is fairly active.

Los Angeles—Although sheet demand continues to falter, many observers believe that requirements are due to stiffen. They point out that some fabricators may have ample stocks of flat-rolled material, but others have allowed their inventories to fall to dangerously low levels in hope of steel price reductions. Many of these fabricators are coming back into the market. Automotive assembly plants, running as they are at full blast, currently comprise the principal outlet for strip and skelp in this district. Demand is strong for plating quality material.

San Francisco—A survey of principal users of sheets in this area indicates most fabricators are carrying an average inventory of 30 days' supplies. Some companies such as furnace makers, who now are in a seasonally dull period, have larger stockpiles of flat-rolled products. With ample supplies in the hands of consumers, no tendency is shown to increase forward buying and demand remains dull. Light gage galvanized sheets are less plentiful than other products, but by this time there is no serious stringency.

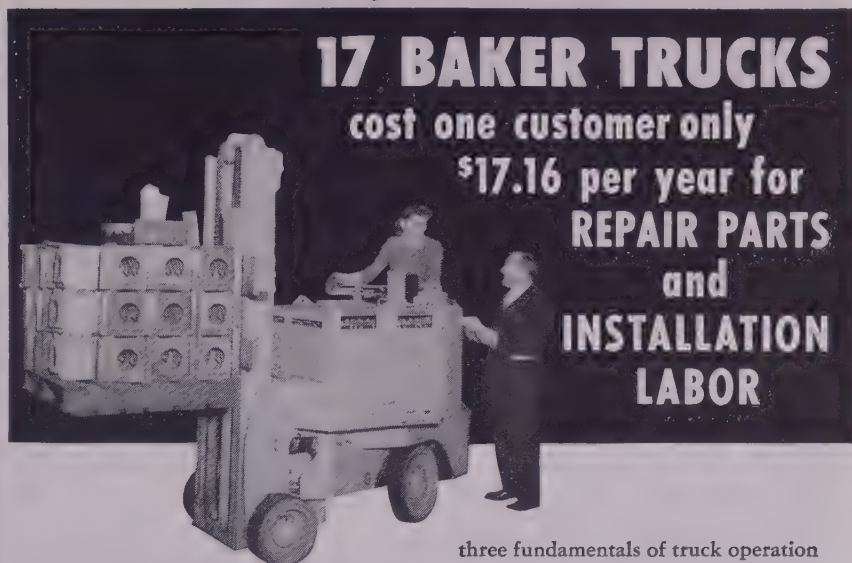
Tubular Goods . . .

Tubular Goods Prices, Page 115

Pittsburgh—Relatively little production of tubular products was lost during period of last minute strike preparations by some producers. In most instances, semifinished stocks were adequate to sustain finishing production schedules during a brief period of basic steel production curtailment. Advance in zinc quotations last week has raised the question whether leading producers of galvanized pipe would adjust price upward. Trade opinion is to effect that $\frac{1}{2}$ -cent advance was not large enough to warrant upward adjustment in quotations at this time.

There is no longer the frantic demand for oil well casing and oil well tubing. However, sellers have full order books through 1949 and contend overall requirements this year will be only slightly below 1948. It is pointed out that rotary rigs

*Are you checking
for lower costs?*



17 BAKER TRUCKS
cost one customer only
**\$17.16 per year for
REPAIR PARTS
and
INSTALLATION
LABOR**

three fundamentals of truck operation are observed:

1. Proper selection of trucks
2. Proper use of trucks
3. Proper preventive maintenance

One of the largest users of battery-powered industrial trucks in the country has 17 BAKER TRUCKS of various types in service at one of its midwest plants. The plant keeps an accurate accounting of maintenance costs, and recently gave us these figures:

DATES OF PURCHASE

3 Trucks in 1941	4 Trucks in 1943
2 Trucks in 1942	7 Trucks in 1946
1 Truck in 1947	

Total months of service for all 17 trucks—954. Average age of trucks—4 $\frac{1}{2}$ years.

Total Cost of all repair parts plus labor installation cost—\$1366. (Exclusive of battery charging, tires and lubrication)

Cost per month for 17 trucks \$ 1.43

Cost per year for 17 trucks 17.16

Cost per year per truck . . . 1.01

Cost per month per truck . . . 8.4¢

Types of Truck—9 Fork Trucks, 1 Crane, 7 Platform Trucks.

This is obviously not a typical case. However, it does show what can be done, under ideal conditions, if the

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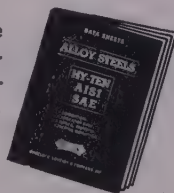
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BILLETS AND FORGINGS FOR PRODUCTION, TOOL ROOM AND MAINTENANCE REQUIREMENTS.

in operation early this month numbered about 1999, only 219 below total in corresponding period last year.

Distribution of standard pipe remains on mill allotment basis, with producers scheduling production 30 days ahead.

Los Angeles—Demand for pipe is strong and improving steadily. Requirements for ½ and ¾-in. diameters are so heavy these items have been placed on allocation. Utilities are specifying substantial tonnages of 2-in. pipe for connecting new residences with main lines. Fabrication of heavy pipe continues actively, with major projects underway. Consolidated Western Steel Corp. currently is in production on gas lines for Transcontinental Gasline Corp. and Pacific Gas & Electric Co., as well as the Saudi Arabian oil line.

San Francisco—Pacific Gas & Electric Co. has started trenching excavation for the California end of the new natural gas line to be laid from Texas to San Francisco bay. Pipe for the project, which will be supplied by Consolidated-Western Steel Corp., will be 34 inches in diameter.

Seattle—Cast iron pipe market is static with no sizable tonnages pending. Some contract cancellations have been noted within the last month.

Kirkland, Wash., has called bids July 25 for 26,000 feet 4 to 8 inch class 150, various types. Alderwood district, Washington, will receive tenders the same day for about 7000 feet 4 inch steel pipe and fittings.

Steel Bars . . .

Bar Prices, Page 114

New York—Bar inventories are still heavy and new buying is confined to fill-in requirements on which delivery is two to three weeks on both hot and cold-finished carbon stock. Warehouse stocks are especially heavy and distributors have canceled some tonnage scheduled for August delivery. Third quarter has been written off as one of the slowest in years for this product and not much new volume is expected before September; even then a substantial improvement in consumption by larger consumers will be required before inventories can be worked down to a point where resumption of active buying may be expected.

Boston—Despite the slow rate carbon bars are going into end-use products, consumption is ahead of order placements; this means buying is limited to small fill-ins with emphasis on working off stocks. Not before September, if then, are bar orders expected in normal replacement volume because tonnage held by some users is relatively substantial and upturn in fabricators' output will be required for real activity. Producers and distributors are also coasting along with good carbon and alloy bar stocks which is reflected by reduced output at bar mills, notably cold-finished.

Philadelphia—Carbon bar openings in August schedules are frequent with consumers drawing largely on inventories and confining buying to fill-ins. Mills have built up well-rounded stocks of cold-finished bars in some instances to the point where further operations for that purpose

are lower. Almost without exception, larger users of bars are consuming at lower levels. Warehouse stocks of bars are substantial and jobbers are placing a minimum of volume, including August. Forward buying is nil. Alloys are in much the same position as carbon stock.

Chicago—Apace with lessening activity in general metalworking, demand for steel bars has relaxed further, alloy and cold-finished bars being affected to greater extent than hot carbon bars. Bookings are good for July with most mills but still spotty for August. Contributing to sag in demand is the now noticeable decline in agricultural implement production, a number of makers reporting downward adjustment in schedules due to the heavy stocks of finished machines which many distributors now hold. Low level of production at many forgers' plants is also an important contributor to reduced demand, several forgers reporting they see no chance of improvement in their schedules over the remainder of the year. Pressure has been strong on them for lower prices and competition from forge shops outside of the district is reported strong. Warehouses, too, no longer press for tonnage; in fact, many have reduced their orders, stocks now being well balanced at most outlets. Railroad demand is spotty, with what new buying is in prospect apparently being offset by planned reductions in repair and new car-building programs.

Los Angeles — Demand for steel bars is perking up after being in the doldrums for many months. Encouraging to suppliers is the fact that the improvement is not coming from any one direction, but apparently stems from many outlets. Some users are believed to be replenishing inventories that were liquidated too hastily in recent months.

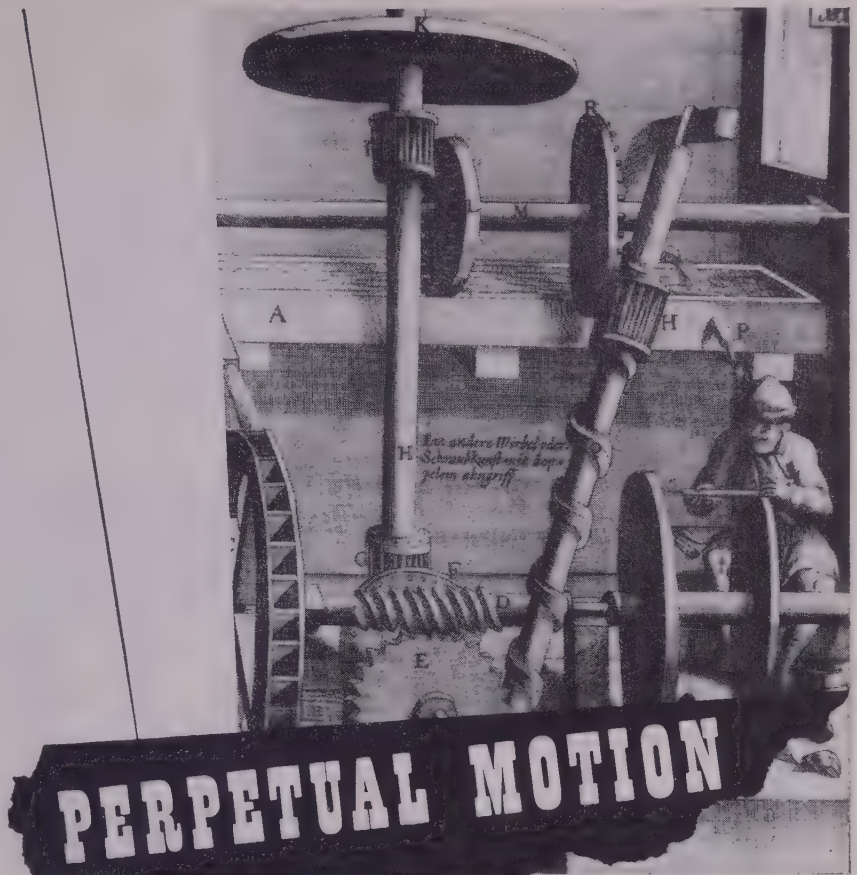
Tin Plate . . .

Tin Plate Prices, Page 115

Pittsburgh — Prospect of uninterrupted steel operations over next 60 days is of major importance to tin plate producers in the meeting of peak seasonal requirements during this period. Mill stocks of tin mill products were sharply depleted in recent weeks as result of can companies attempting to augment inventories as a hedge against threat of steel strike. Prior to recent drain on mill stocks producers were building up inventories for first time in postwar period.

It is too early to accurately forecast to what extent can companies will continue to release specifications for September and October delivery in light of probable reduction in requirements for fourth quarter and the substantial increase in their tin plate inventories. A reduction in new specifications is anticipated by some trade authorities as a natural reaction to the abnormally heavy shipments during the last few weeks from mill stocks to consumers. Mill inventories are expected to be gradually rebuilt over next 60 days to levels prevailing through May.

Tin plate production schedules will not be adversely affected by last minute banking of blast furnaces and



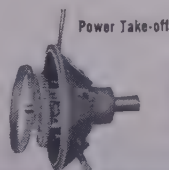
Copper engraving by Boeckler, circa 1675
Courtesy of The Bettmann Archive

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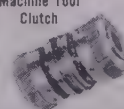
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curtailment of ingot production by some producers in preparation for a then-threatened steel strike. Electrolytic tin plate demand continues in excess of industry's ability to produce, with the reverse true of hot-dipped.

Washington—Removal of quantitative quotas limiting exports of tinplate and terneplate, effective Oct. 1, was announced last week by the Office of International Trade. The action lifting export quota restrictions is made possible by increased domestic supplies of tin mill products, OIT said.

Under the new "open-end" provisions, exporters must continue to secure validated licenses covering shipments of the products, and must also

observe all other applicable export regulations. All license applications will be screened by OIT for excessive quantities, as well as for end-uses, which must be among those permitted in this country by allocation orders M-81 and M-43.

San Francisco—Major tin can producers in this area, who supply California food canners with the bulk of their needs, have received larger than normal shipments of tin plate from eastern mills and, as a result, are in good position to handle needs of the food packers. Tin plate producers had stepped up shipments when the possibility of a strike appeared strong. The largest tin can producer in the area has sufficient stocks for anticipated demand until Sept. 15.

Plates . . .

Plate Prices, Page 115

Boston—Plate fabricating shop order backlogs are down to hard-pa scattered small tank orders are appearing, 1000 to 5000-gallon capacity each, but fabricators are buying as needed, making slight effort to replenish inventories. Improvement in deliveries is a factor in the policy; while some mills are in September, others can make shipments in matter of days. Heavy plates for weldments are slow with inventory sufficient to carry along current production schedules. Miscellaneous industrial demand is spotty with orders generally offered and placed on delivery basis. Shipyard requirements are holding, but mills experience little difficulty in keeping pace with yard needs; Quincy yard has laid keel for the *Constitution*, sister liner of the *Independence* which has been under construction for several months.

New York—Plate buying is slow although some mills are in September. Railroad purchases are extremely light with inventories substantial. Tonnage taken in for car building is included and carriers are ordering steel sparingly with some tonnage deferred. Shipyard activity in this area is limited largely to repairs while orders from plate fabricators are held to spot lots on which delivery is a factor in placement. While some plate mills are scheduling for September, others can ship in matter of days.

Philadelphia—Marked by light demand, plate deliveries vary widely (from September to within few days). An increasing ratio of plate is being shipped by truck and longer hauls. With exception of structural shops, consumers' backlogs are lower and their buying reflects this. Volume going to shipyards is well sustained but tank builders are generally looking for volume. Railroads are holding back tonnage and have substantial inventories which were taken in against car building programs. Truck builders in the East are also on lower production level. Floor plate is slow with warehouse distributors holding heavy stocks in some instances.

Birmingham—No surplus, even moderation, has thus far appeared in plates despite a moderate slowing down in general industrial activity, notably shipbuilding and repair. It is learned officially that steel mills have not stocked any plate tonnage and that production is holding up near the capacity mark. Republic Steel Corp. continues to divert a large proportion of its plate tonnage to the tube mill.

Los Angeles—Plate no longer is in short supply, but demand continues strong and plate mills are operating virtually at capacity. Although some eastern plate is being sold here, freight costs bring it several dollars a ton over the prices of western material. Deliveries on western plate are much improved, ranging from 30 to 60 days, as compared with the former 18 to 30 months.

San Francisco—Although light gage plates are moving slowly, heavy demand continues for gages used in constructing oil and gas pipeline

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New pipeline projects just getting underway in California and lines being planned for the Rocky Mountain area indicate no let-up in orders for heavy plates for several years to come.

Seattle—Public works are taking most of the output of plate fabricating shops, but plants report also a fair volume of small jobs for tanks and boilers. The proposed oil 8-inch pipeline from Salt Lake City to Boise, Idaho, 320 miles, will require about 24,000 tons of steel.

Largest project pending involving plates is the McNary dam, Columbia river, 14,900 tons for cofferdam and other work, bids opened by U. S. engineer, Walla Walla, Wash., July 19. Consolidated Western Steel Corp., Los Angeles, is apparently low \$50,186, for a two-million gallon steel water tank at Grand Coulee, involving 250 tons.

Structural Shapes . . .

Structural Shape Prices, Page 115

New York—Backlogs in fabricated structural steel are centered heavily with larger shops with competition among smaller units notably keen. Deliveries are improving, although three and one-half months is still the earliest available from the largest fabricator. Lower prices have revived some volume which has been held up; building costs are estimated around 15 per cent under peak, but steel, which never climbed as high as many other materials, is still lower. Better supply of plain material in more sizes is contributing to reduced prices for fabricated material. Inquiries, notably public work, are holding up well.

Boston—Accumulative factors in improvement of availability of structural steel are competitive deliveries, lower prices for fabricated material and build-ups of mill stocks of both rolled and semifinished tonnage. Cheaper prices for steel in place are not bringing out much additional private construction, but shops are competing keenly for tonnage up for estimates. Another result is return to including structural specifications in contractor estimates for public work, notably bridges; several states during shortage period bought directly. New inquiry is slow, lagging public work not replacing private building, although there are numerous small bridges, requiring a minimum of shop work.

Philadelphia—Spurt in fabricated structural steel contracts is led by 5800 tons, Pier 80, South Philadelphia, to Bethlehem Steel Co. Inquiry for bridges is heavier, notably for the Pennsylvania turnpike with close to 1600 tons placed and several thousand tons being estimated. Private work is also somewhat more active, including 650 tons, warehouse, Sears, Roebuck & Co. Plain material deliveries are available in most sizes at prompt delivery with openings in mill schedules for August.

Chicago—Until business conditions become more settled, many district fabricators are certain a number of projected commercial and industrial projects will be held in abeyance. Work recently awarded and pending for the most part consists of gov-

ernmental and utility construction, although the number of small commercial structures being raised locally continues as an important prop to structural steel demand. Leading project last week was a steam power plant for Dairyland Power Co., Cassville, Wis., bids received July 21, requiring 1000 tons of structurals and 350 tons of sheet piling.

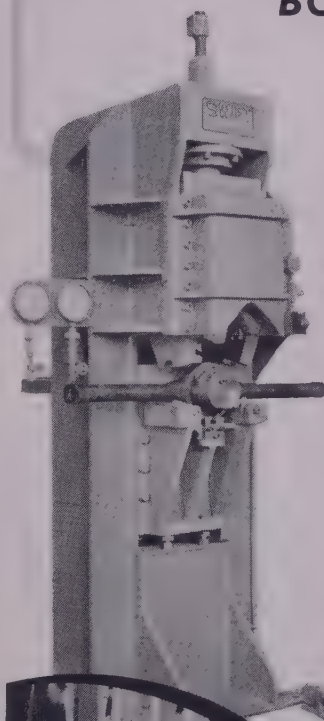
To American Bridge Co. goes the job of erecting a cyclotron at Argonne National Laboratory here with the magnet forgings to be provided by Carnegie-Illinois Steel Corp. Installation is planned for October.

San Francisco—Contractors report ample supplies of most structural

items. Inventories have been built up in expectation of a steel strike, and with the exception of a few specific products users are buying "close to the vest," as far as future needs are concerned.

Los Angeles—Despite the fact that engineering awards in this district continue in exceptionally heavy volume, supplies of structural shapes are greater than those of any other steel product. Substantial western production capacity for shapes, combined with the fact that Pacific Coast construction presently is concentrating on public and residential building rather than industrial and commercial projects, has greatly reduced the demand for structurals. Offer-

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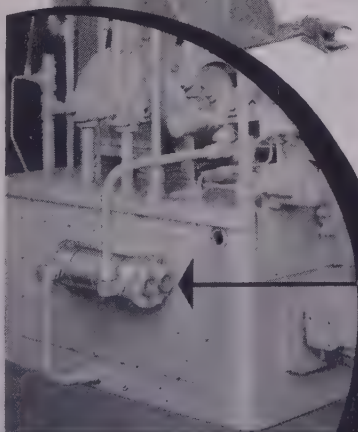
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ings of surplus are large and, of course, interfere with mill bookings. Nevertheless, some improvement is in sight. Many projects are on the boards and have been held there for price reasons. Some of these are being released and indications are that under stable conditions more will follow.

Seattle — Fabricators have fair backlogs and report a sizable volume of new business, chiefly in tonnages of less than 100 tons each. General construction continues active. Public works are absorbing the bulk of structural output in this area.

Bids are in to Washington state for a highway span involving in excess of 200 tons. Bids are in also to U. S. Engineer for the McNary dam, involving 610 tons. Several other projects are pending including 300 tons for a seawall at Nome, Alaska, and 200 tons for an auto freight terminal, Seattle.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 114

Seattle—Efforts of management were concentrated in expediting deliveries of steel products. Consequently, rolling mill backlogs have been somewhat reduced. Pressure for small tonnages of reinforcing bars continues strong.

Largest projects pending include 500 tons for the Winchester Waterway, Columbia basin, general contract awarded and 300 tons for Montana state highway bridges, reported placed with unnamed producer. Plant of Northwest Steel Rolling Mills Inc., Seattle, continues idle due to labor disagreement.

Wire . . .

Wire Prices, Page 115

Birmingham — Demand for most wire products is consistent, but not in as great a volume as several months ago. Wire fencing is still relatively scarce, especially woven fence. Most items in nails are reasonably strong and some of the more popular sizes remain on the scarce list.

Los Angeles—Wire products are in good demand, with Bethlehem Pacific Coast Steel Corp.'s new wire mill here running at capacity. Substantial buying by spring and upholstery manufacturers reflects the continued heavy requirements of the automobile industry.

Plans Cut in Operations

Buffalo—Symington Gould Corp. will reduce its open hearth operations at Depew from two furnaces to one and lay off 250 of its approximately 950 workers late next month, a company spokesman said last week. The company has four open hearths at the plant.

The Depew works will suspend production for a plantwide vacation Aug. 5, with resumption scheduled Aug. 22, when the reduced operation will become effective.

The spokesman blamed the lag in

buying of railway equipment for the reduction.

In June, the company suspended production of steel ingots for automotive plants.

Pig Iron . . .

Pig Iron Prices, Page 116

Pittsburgh—Merchant iron sellers report a sharp drop in shipments following flurry in deliveries from stock resulting from consumers attempting to augment inventories as a hedge against a threatened steel strike. Consumption of merchant iron to date this month has been affected adversely by many foundries shutting down for a two weeks' vacation period. The outlook is more promising, however, with some signs that an increasing number of foundries will have to re-enter the market for stock replacement purposes in near future. By early last week, all U. S. Steel Corp.'s subsidiaries' blast furnaces which had been banked in preparation of a threatened steel strike had been returned to normal operations.

New York—Any change in pig iron movement would logically be upward and some improvement in shipments next month and September are expected from the July low. However, current outlook for a substantial improvement in melt is clouded. Demand for basic is also slackening. Some steel producers have built up fair stocks of semifinished steel in form of slabs and billets which have contributed to the dip in rate of operations.

Philadelphia — Mild flurry in releases against possible steel strike was not followed by cancellation when immediate danger of that contingency passed. Some orders have been extended over a longer period for delivery. Numerous smaller foundries are not carrying burden some tonnages of iron and even mild improvement in business would bring out orders from melters in the category. July, however, will be one of the slowest months in years with indications of a moderate improvement in August and September.

Buffalo—A moderate increase in shipments of merchant iron during the first half of July in anticipation of a steel strike may be reflected in even lighter than expected releases next month. Meanwhile, blast furnace operations were unchanged at the postwar low and pig iron inventories of some suppliers were reported still too high for comfort.

Cincinnati—Demand for pig iron is unimproved, remaining at the lowest point in years. Exhaustion of inventories may bring a modest upturn next month, but seasonal factors intrude to block any considerable increase in the district melt. Desultory ordering, in both northern and southern iron, is for near need only. Melters ask shipments be on minimum carloads.

Birmingham—Pig iron's recovery reported as continuing along moderate lines with shipments in July ahead of those in June. June shipments were somewhat better than those of May. Merchant iron men say unusually large inventories are gradually being worked off.

Warehouse . . .

Warehouse Prices, Page 117

New York.— Reflecting slow demand and improved mill shipments warehouses are not buying beyond August delivery and tonnage for that month is limited in some instances. Inventories are substantial on standard carbon products, notably bars; there is some overloading in the latter product. July volume with distributors will be lowest since before the war. Alloy products move slowly. There is price shading in nails and pipe among smaller distributors, limited mostly to one or two sizes in the former product while withdrawal of consigned pipe stocks prompts some holders of tonnage to turn stock into cash.

Pittsburgh — Daily average shipments from warehouse stocks to date this month are below corresponding period in June, due primarily to mass vacations among metalworking concerns and continued effort on part of many consumers to reduce inventories to more realistic levels. Despite threat of steel strike, warehouse steel consumers did not significantly step up new ordering because of adequate stocks in relation to declining requirements. For much the same reasons, steel distributors contend they did not build up their stocks as a hedge against a possible industry-wide strike. Distributors' inventories are more than adequate in specialty steel product classifications, while carbon grades are also in good balance with exception of light gage galvanized sheets and wide flange beams.

Chicago—Spurt in buying which immediately preceded the July 16 strike deadline at many district warehouses evaporated last week leaving many distributors with a lower volume of orders than at any time in the postwar period. Most of them had been enjoying a fairly comfortable volume of business until July 1, but in the latest week ordering was only about half as great as in the latter part of 1948. Buying by warehouses has slowed appreciably for this reason and most report that stocks are now well balanced on all but a few items, namely: Galvanized sheets, structurals, plates and certain bar shapes, particularly flats and a few angle sizes. Pick up in business is expected by many distributors next month or in September when it is expected that inventories in consumers' plants will have been worked down and the vacation curtailments will not be as important a factor. Higher galvanized sheet prices were put into effect by several distributors on July 20, the new warehouse price for 10 gage being 6.85 cents, up \$1 a ton.

Cincinnati — Sales of steel from warehouse have not yet rebounded in full from the slack developing from early-July vacations. August may bring increased demands, once vacations are out of the way and inventories are reduced further. Delivery of most items is prompt, with individual orders tending smaller. Galvanized and cold-rolled sheets have been hard to stock, but, in general, jobbers' inventories are in fair balance.

Birmingham — Warehouse stocks

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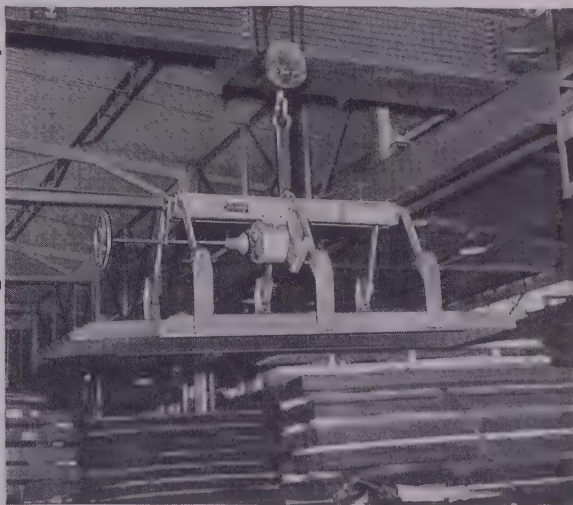
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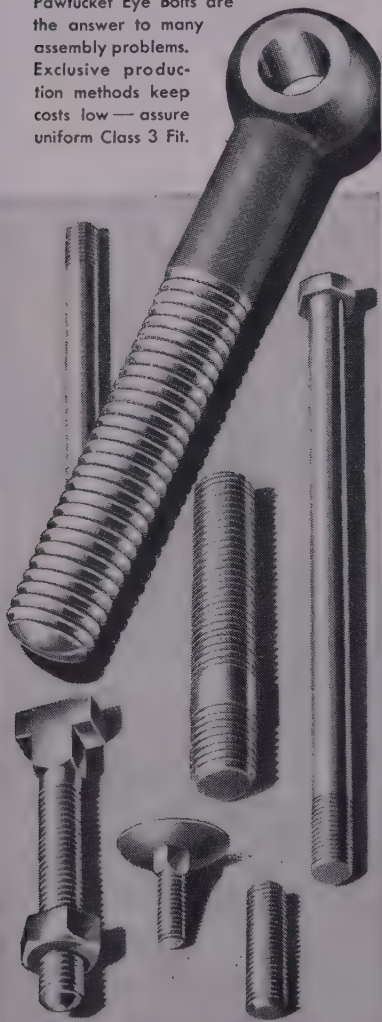
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are gradually improving with light gage galvanized sheets probably the scarcest item. Warehouse interests report demand picking up with shipments this month so far considerably improved over June.

Los Angeles — Warehousemen in recent weeks have reported increased orders, much of which they attributed to protective buying in light of a possible steel shutdown. They now are cheered by the fact that news of the moratorium did not greatly reduce this demand, indicating it was not entirely for inventory purposes. Jobber activity as a result is considerably better than it was 30 days ago. With lists of surplus still being circulated among the warehouses, however, steel jobbers at the moment are buying little from the mills. Principal concern is to balance stocks, and surplus items are being offered at concessions ranging to \$10 per ton under mill price.

San Francisco — Jobbers in this area are carrying inventories averaging about 60 days' supply at normal rate of distribution. Meantime volume continues slack. Although half of the warehouses in San Francisco are closed by the warehousemen's union strike, those remaining open report they have noticed no resultant increase in their volume of business.

Seattle — Jobbers are gradually replenishing stocks, although galvanized sheets and plates are still tight. The latter item is easing but sheets are not yet in good supply. Producers will accept orders but deliveries are uncertain. In view of possible steel industry strikes, some customers have bought in advance, general volume of warehouses being higher than last month.

Scrap . . .

Scrap Prices, Page 120

Cleveland — An upswing in cast iron scrap prices developed last week, but it may prove to be only a temporary development. Sellers can find little basis for the hope of a sustained show of strength. It was pointed out that most foundries had withdrawn from the market when the prospect of a steel strike was ominous and that they had re-entered the market for fair tonnages immediately following the announcement of the agreement for keeping the mills open for at least 60 days. This "flurry" of buying was the cause for the \$2 upward revision in prices last week.

While declining rate of operations in foundries is an important factor in the underlying weakness of the market, the fact that pig iron has become more plentiful is an equally important factor. Large stocks of scrap had been accumulated through the first quarter of this year on the basis of a high ratio of scrap to iron in the melts; with the ratio now at a normal level, scrap stocks have been reduced and, in some instances, must be cut further.

With buying of cast still spotty, the market is quoted nominally as follows: No. 1 cupola, \$25.50-\$26.50; charging box cast, \$20.50-\$21.50; stove plate, \$19.50-\$20.50; heavy breakable cast, \$17.50-\$18.50; unstripped motor blocks, \$16.50-\$17.50; malleable, \$19.50-\$20.50; brake shoes,

\$18.50-\$19; clean auto cast, \$28-\$29; No. 1 wheels, \$22-\$23; and burnt cast, \$16.50-\$17.50. A large foundry here has purchased heavy steel turnings at \$19, delivered.

No. 1 railroad heavy melting and railroad malleable are quoted slightly higher at \$21-\$22, while rails, feet and under, are quoted lower at \$26-\$27; cast steel and railroad specialties at \$22-\$23.

Pittsburgh — Scrap shipments previous commitments were resumed last week following assurance steel industry's operations would not be interrupted by strike for 60 days at least. Trade expects major mills to re-enter the market for relative large tonnage of dealer scrap before end of the month, despite fact mill inventories are unusually large and in spite of outlook for lower steel production levels due to lack of new orders. Some mills state scrap receipts from customers plus "home" scrap are more than ample to sustain present operating schedule. Present price levels have discouraged the collection and handling of scrap at remote points for delivery here. It is pointed out, for example, that No. 1 heavy melting at \$21 in Pittsburgh, must be bought at around \$10.40 in New England to be shipped here at that level. Brokers claim they would hesitate accepting large tonnage orders at \$21 because of the reason, and because of this they do not expect the market to go any lower. Several sellers participated last week in a sale of short show turnings to a local blast furnace at interest at \$16 per ton, delivered. The sale was not sufficiently representative to justify a change in the nominal quotation of \$16.50-\$17.

New York — Buying of cast grades is confined to small spot lots at unchanged prices with \$19-\$20, shipping point, paid by brokers for No. 1 cupola cast.

Steelmaking grades are hardly active enough to establish prices with heavy melting steel nominal at \$11.50. At these low prices, "take" at yards is falling off with preparation activity slow. As steel operations slacken, higher ratio of home and industrial scrap is employed in most instances.

Boston — Scrap buying is so slow prices quoted for most grades are nominal. One Connecticut steelworks is taking in some tonnage, but on the whole, market is flat. Foundries show slight interest in cast as price trends sag. At current prices yards are taking in minimum tonnage and collectors, as well as pressers and yard operators, are idle.

Philadelphia — Railroad and industrial scrap shipments meet steel mills' needs. The flow of German tonnage against current contracts is nearing an end. Home scrap volume is bolstered by slower movement of seconds, plate ends and other finished steel of like character which have moved readily until the last two months. This volume is now going back as scrap. Dealer and yard activity is near a standstill at current low prices which are for the most part unchanged from both steelmaking and foundry grades.

Detroit — The monthly lull before issuance of automotive scrap list finds the market stalled but plentiful of conversational pulling and hauling.

Chrysler tonnage is reported appreciably higher and the Fisher Body total probably will be of near-record proportions. The downriver electric furnace producer may be buying again in August after an extended shut-down for equipment installations. Better sentiment prevails in cast iron grades, all being marked up \$1 per ton in the face of dried-up stocks.

Buffalo—Steel mill scrap prices slipped again last week as one of the leading consumers placed orders for a comparatively small tonnage of No. 2 steel at \$16.50 and No. 2 bundles at \$14.50, or \$1 under the last previous business reported. This weakness had a tendency to undermine other grades. Blast furnace scrap was pared 50 cents, largely in sympathy with the steelmaking material, although demand was almost nonexistent. Rail specialties lost a nominal \$1.

No. 1 heavy melting steel, however, was unchanged, with bids of \$19 by local consumers getting the cold shoulder from dealers. Floating supply of the top steel grade is definitely limited here, with most of it reported in strong hands.

Trade in cast scrap was at a minimum.

Cincinnati—The iron and steel scrap market developed a stronger undertone last week, but without any upturn in demand. Reports that some grades turned more active in the South have helped the market here. Whittling of consumer inventories also may have been a factor. New buying was absent, and prices not truly tested. Suspensions were lifted on some old orders, and aid in preventing any distress material. At present prices, collection of country scrap is off sharply.

Chicago—There seemed to be more disposition among dealers to stockpile scrap last week, feeling being that perhaps the bottom of the price decline has in fact been reached. This attitude, while by no means universally held, has pervaded a considerable section of the trade and while not reflected in the price of any scrap grades except cast seems likely to play an important role in future activity. Meanwhile, no new mill buying has been reported, and only a limited quantity of scrap in a few grades is moving on orders for July delivery. Until the market is tested the foregoing remains in the realm of speculation. It will be recalled that mill purchases of dealer material were light in the closing days of June; in fact, one major mill placed no order for this material. In view of this, opinion is mixed whether or not dealer scrap will be bought for August, although some traders feel that orders may show up in the coming week. Allocated material that is taken in, according to some brokers, accounts for only a limited percentage of available scrap but has been sufficient to keep mills' stocks reasonably high.

Birmingham—Scrap is still dormant as far as open-hearth grades are concerned. But cast items have shown signs of revival in the past few days since a considerable part of the accumulation on stockpiles has been used. Continuing unsettled conditions, however, mean considerable sluggishness for the market as a whole.

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are buying a little domestic scrap, requirements are small and selective. Some indication of the possible price trend in this district is seen in the fact that northern mills are buying heavy melting steel several dollars under the market. The price structure is uncertain and confused here, with rerolling rails off \$2.50 to \$22.50 gross ton, while punchings and plate scrap, for which demand is a little better, are up \$2.00 to \$26.00. Foundry activity remains limited, but No. 1 cupola cast is steadily at \$27.50 per gross ton.

San Francisco—Dullness continues in the scrap market. Mills still are amply supplied and movement in domestic yards is nearly halted.

Seattle—Scrap receipts are steady, mills receiving as much as is required, although shippers seem to be holding back, dissatisfied with the present price of \$17 for No. 1 and No. 2 heavy melting. Ship breakers, who still have small backlogs of surplus vessels, have discontinued operations, asserting there is no profit under present market conditions. Another full cargo of scrap is en route here from Japan for Bethlehem Pacific Coast Steel Corp.'s plant.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 116

Pittsburgh — Connellsville beehive coke ovens are expected to remain banked during this period of 3-days-per-week coal mining schedule enforced by Lewis. Dearth of new orders and growing open market supply of oven furnace and foundry coke are additional factors in this connection. Integrated mills have abnormally large stocks of both coal and coke. However, the short-week working schedule among captive and large commercial mines might prompt large coke consumers to encourage opening of small commercial coal mines in effort to maintain present inventory position. Demand for foundry coke shows few signs of improving; in fact, the reverse is temporarily the case during mass vacation periods among foundry interests.

Iron Ore Stocks Increase

Cleveland—Stocks of Lake Superior iron ore at furnaces and on Lake Erie docks increased to 27,696,146 tons as of July 1 from 21,508,087 tons a month earlier and 26,964,508 tons a year ago, according to the Lake Superior Iron Ore Association. In the United States, stocks increased to 23,614,188 tons on July 1 from 18,265,408 tons on June 1 at furnaces and to 2,739,113 tons from 2,235,115 tons on Lake Erie docks. In Canada, stocks at furnaces increased to 1,342,845 tons from 1,007,564 tons.

Total consumption of Lake Superior iron ore declined to 6,248,535 tons during June from 7,276,719 tons in May and compared with 6,577,471 tons for the like 1948 month. This brought the total for the first six months to 43,164,766 tons from 38,341,534 tons for the like period a year ago. In the United States, consumption eased in June

to 5,998,786 tons from 7,014,544 tons in May and compared with 6,342,447 tons in June of last year. This brought the total for the first six months to 41,712,177 tons from 36,890,817 tons for the first half of last year. Consumption has held steady in Canada, amounting to 249,749 tons in June compared with 262,175 tons in May and 235,024 tons in June 1948, bringing the total for the first six months of this year to 1,452,588 tons against 1,450,717 tons for the like 1948 period.

During June, 23 furnaces were banked in the United States and 1 in Canada, making the number idle 44 in this country and 2 in Canada or a total of 46 compared with 23 as of June 1 and 14 as of July 1, 1948. The number in blast in the United States as of July 1 was reported as 141 against 164 a month earlier and 171 on July 1, 1948. In Canada, 8 furnaces were in blast on July 1 against 9 a month earlier and on July 1, 1948.

Ore Shipments Continue Heavy

Cleveland—Lake Superior iron ore shipments increased during the week ended July 18 to a new high for the season to date, according to the Lake Superior Iron Ore Association, this city. The heavy movement of ore continues despite the downward trend in consumption since last April and the threat of a strike in the industry. Some interests in the trade expect shipments to be maintained close to the present rate for several weeks and an early tie up of ships if stocks become excessive.

Shipments for the week ended July 18 totaled 3,024,539 gross tons compared with 2,951,236 tons for the preceding week and 2,697,734 tons for the like week a year ago. Shipments from United States ports alone totaled 2,971,340 tons during the July 18 week, or at an average daily loading rate of 424,477 tons, compared with 2,917,168 tons, or an average daily rate of 416,738 tons, for the preceding week.

Total shipments of iron ore for the season to July 18 came to 40,584,208 tons, an increase of 2,818,502 tons over the total of 37,765,703 tons for the like period a year ago. Shipments from United States ports alone totaled 40,040,648 tons for the season to date, an increase of 2,708,072 tons.

Scrap Duty Suspension Approved

THE HOUSE last week approved a bill to suspend import duties on ferrous and nonferrous scrap until June 30, 1950. Suspension of the duty lapsed June 30, and the bill just approved would be retroactive to that date.

The House Ways & Means Committee had voted not to continue the suspension of the import duty on aluminum scrap but objections were withdrawn later and as the bill finally passed in the House, aluminum scrap would be allowed to come in duty free for another 12 months.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

300 tons, Pier 80, South Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, apartment building, 36th street and Park avenue, New York, to Harris Structural Steel Co., New York; Emery Roth & Sons, architects.

315 tons, bridges, sections 27C and 28A, Pennsylvania Turnpike, to Bethlehem Steel Co., Bethlehem, Pa., through Lane Construction Co., Meriden, Conn., general contractor.

200 tons, two highway bridges, Montana State, to Allied Structurals; Anderson Construction Co., Great Falls, general contract.

50 tons, manufacturing plant, Hyatt Bearings Division, General Motors Corp., Linden, N. J., to American Bridge Co., Pittsburgh.

85 tons, catapult, Navy yard, Philadelphia, to American Bridge Co., Pittsburgh.

50 tons, warehouse, Sears, Roebuck & Co., to Bethlehem Steel Co., Bethlehem, Pa.

50 tons, admissions building, State Hospital, Harrisburg, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

25 tons, service building, Delaware Power & Light Co., Wilmington, Del., to Bethlehem Fabricators Inc., Bethlehem, Pa.

50 tons, switch gear test station, General Electric Co., Philadelphia, to American Bridge Co., Pittsburgh.

30 tons, section 27B, Pennsylvania Turnpike, to Bethlehem Steel Co., Bethlehem, Pa., through S. J. Groves Co., general contractor.

50 tons, St. Mary's church, 224th street, New York, to Grand Iron Works Inc., that city.

STRUCTURAL STEEL PENDING

700 tons, 10-story building, Mt. Sinai Hospital, New York; bids July 25.

125½ tons, Pennsylvania Turnpike Commission, James F. Torrance, secretary, 11 No. Fourth St., Harrisburg, Pa., as follows:

58½ tons, sec. 26A, Lancaster county, July 29; 278 tons, sec. 28B-1, Chester county, July 22; 1589 tons, sec. 28B-2, Chester county, July 22.

600 tons, including 500 tons of silicon structural steel, pedestrian lift bridge over Harlem river, New York, connecting 103rd street, Manhattan, with Ward's Island; bids Aug. 12, Triborough Bridge and Tunnel Authority, New York.

500 tons, steam power plant, Dairyland Power Co., Cassville, Wis.; bids opened July 21; also included are 350 tons of sheet piling.

10 tons, McNary dam, Columbia river; bids in to U. S. Engineer.

50 tons, incinerator, Queens, N. Y.; bids in, Department of Plants and Structures.

5 tons, elimination Erie railroad grade crossing, Wagaraw road, Hawthorne, N. J.; bids Aug. 4, Trenton, N. J.; also 45 tons reinforcing steel.

20 tons, I-beam bridge, Liverpool borough-McKees Half Falls, Pa.; bids Aug. 5, Harrisburg.

50 tons, steel transmission towers, Mesa and Coolidge, Davis Dam project, wanted March, 1950.

60 tons, bridges, Fonda, N. Y., and Paris, Ill., New York Central railroad; bids July 26 on structural steel direct, New York.

15 tons, galvanized fabricated steel, Mesa and Coolidge substations, Davis Dam project, Ariz.; bulk of tonnage wanted March, 1950.

10 tons, Lake street elevated project, Chicago; American Bridge Co., Pittsburgh, low.

50 tons, Washington state highway bridge; bids in.

50 tons, I-beam bridge, Glen Hope borough, Pa.; bids Aug. 5, Harrisburg, Pa.

Unstated, stop logs, lifting beams, miter gate, machinery, for McNary dam; bids to U. S. Engineer, Walla Walla, Wash., Aug. 23.

Unstated, including 35 tons reinforcing bars,



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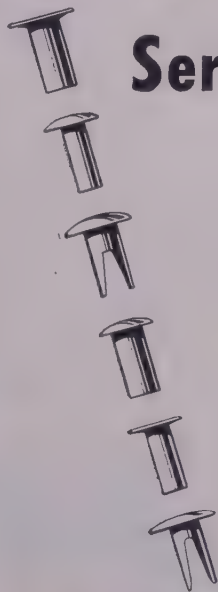
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trash racks, stubs, anchor bars, etc., Coulee power plant; bids to Bureau of Reclamation, Coulee, Wash., Aug. 9.

Unstated, sluice gate, flood control project, near Walla Walla, Wash.; general contract by U. S. Engineer, to McWaters & Bartlett, Boise, Idaho, low, \$40,737.

REINFORCING BARS . . .

REINFORCING BARS PLACED

300 tons, two Montana highway bridges, to unstated interest; Anderson Construction Co., Great Falls, general contract.

100 tons, Blessed Sacrament school, Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle.

100 tons, miscellaneous railroad and road projects, to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

760 tons, pumping plant, Wellton-Mohawk canal, Gila project, Ariz.; bids to chief engineer, Bureau of Reclamation, Denver.

730 tons, Delta-Mendota canal work, Central Valley project, Calif.; bids to chief engineer, Bureau of Reclamation, Denver.

555 tons, highway project, including 155 tons plain steel bars, Liverpool borough-McKees Half Falls, Pa.; bids Aug. 5, Harrisburg.

500 tons, Winchester wasteway, Columbia basin project; general contract awarded J. A. Terteling & Sons, Boise, Idaho, \$1,088,792.

250 tons, Wyoming canal, Riverton project, Wyo.; bids to chief engineer, Bureau of Reclamation, Denver.

135 tons, state highway project, Port Matilda borough, Worth township, Pa.; bids Aug. 5, Harrisburg.

100 tons, bridge, Bureau of Public Roads, Washington state; general contract to Osberg Construction Co., Seattle, low, \$205,632.

45 tons, elimination of Erie railroad crossing, Wagaraw Rd., Hawthorne, N. J.; bids Aug. 4, Trenton, N. J.; also 405 tons structurals.

PLATES . . .

PLATES PLACED

400 tons, 12 steel barges, Army Transportation Corps, Marietta, Pa., to Dravo Corp., Pittsburgh, \$1,164,600.

100 tons or more, steel barges, Army Transportation Corps, Marietta, Pa., to Pointer-Willamette Co., Portland, Oreg., \$139,864.

Unstated tonnage, steel water tank and tower, veterans' hospital, Albuquerque, N. Mex., to Pittsburgh-Des Moines Steel Co., Pittsburgh, \$59,400.

PLATES PENDING

24,000 tons, 8 inch, 320 mile oil pipeline, Salt Lake City, Utah, to Boise, Idaho, for Salt Lake Pipeline Co.; bid details not announced.

14,900 tons, cofferdam and other units, McNary dam; bids in to U. S. Engineer, Walla Walla, Wash.

250 tons, two million-gallon water tank, Coulee, Wash., Consolidated Western Pipe Corp., Los Angeles, apparently low, \$50,186.

PIPE . . .

CAST IRON PIPE PENDING

Unstated, 26,000 ft. 4 to 8 in. class 150, also tenders for alternates; bids to C. F. Trent, city clerk, Kirkland, Wash., July 25.

STEEL PIPE PENDING

Unstated, 7000 ft. 4 inch, districts 34 and 35, Alderwood Manor, Wash.; bids to R. E. Wolff, engineer, Seattle, July 25.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Erie, six 1500-horsepower and one 1000-horsepower diesel-electric switching units to Baldwin Locomotive Works, Eddystone, Pa. Manitou & Pike's Peak, two special 400-horsepower diesel-electric locomotives to General Electric Co., Schenectady, N. Y.

CONSTRUCTION AND ENTERPRISE

ALABAMA

MOBILE, ALA.—Rubberoid Co., 2400 Emogen St., will let a \$400,000 contract for a roofing plant addition; Chappell, Stokes & Brennecke Burt Bldg., consulting engineer.

SHEFFIELD, ALA.—Electro Metallurgical Co. Niagara Falls, N. Y., received bids July 1 for a plant building.

CALIFORNIA

LONG BEACH, CALIF.—Board of Harbor Commissioners has awarded a \$448,676 contract to Guy F. Atkinson Co., 223rd St., Santa Fe Ave., for construction of a bulkhead of 44 steel sheet pile circular cells each 62 ft in diameter.

LOS ANGELES—Graybar Electric Co., 20 Santa Fe Ave., has awarded a \$485,200 contract to William Simpson Construction Co., 816 W. Fifth St., for construction of warehouse and office.

FLORIDA

JACKSONVILLE, FLA.—H. W. Lay & Co. 173rd Blvd. N.E., Atlanta, has awarded \$100,000 contract to Ira H. Hardin Co. Zahner Bldg., Atlanta, for construction of a warehouse and branch office, Beaver St. & McDuff Ave.

MIAMI, FLA.—Baker-Sturdivant Co. received low bid from Mulford Stow, 2117 N.W. 17th Ave., for office building, northwest corner 12th Ave. & 23rd St.; Robert E. Baxter 3126 Coral Way, architect.

SARASOTA, FLA.—Florida Power & Light Co., Ingraham Bldg., Miami, Fla., has awarded a \$350,000 contract, increasing the powerhouse and generating facilities at its West Coast power plant; owner builds.

GEORGIA

COLUMBUS, GA.—Muscofee Mfg. Co., c/o Robert & Co. Associates, architect, 9 Poplar St. N.W., Atlanta, will let a contract for a warehouse addition.

INDIANA

LAPORTE, IND.—American Rubber Product Co., 315 Brighton St., has awarded \$100,000 contract to Larson Danielson Construction Co., 302 Tyler St., for construction of a factory; Boyd E. Phelps, 232 Franklin St., Michigan City, architect.

IOWA

DES MOINES, IOWA—J. F. McLaughlin, vice president, Iowa Power & Light Co., 311 Sixth Ave., has revealed that the company's plans for the proposed \$5 million power generating plant in Council Bluffs, Iowa, are still in the preliminary stage, pending further studies as to size and location of the plant.

KANSAS

COFFEYVILLE, KANS.—Co-operative Refinery Association, P.O. Box 570, has awarded a \$2.2 million general contract to Process Engineers Inc., 5635 Daniels St., Dallas, for construction of a dewaxing plant; Louis C. Brown, chief engineer.

LOUISIANA

HARVEY, LA.—Texas Co., c/o contractor, has awarded a \$150,000 contract to H. K. Ferguson Co., 1054 A. & M. Bldg., Houston for construction of a warehouse.

LAKE CHARLES, LA.—Gulf States Utilities Co., Beaumont, Tex., plans to build a \$1,750,000 generating unit.

NEW ORLEANS—New Orleans Public Service Inc. plans a \$5,136,517 expansion program.

MISSISSIPPI

MERIDIAN, MISS.—Mississippi Power Co. plans ground breaking ceremonies Oct. 17 for a \$5 million electric generating plant.

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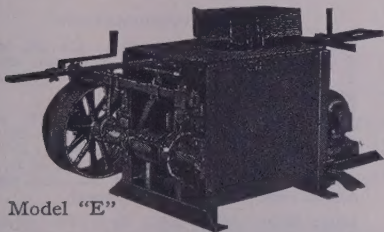
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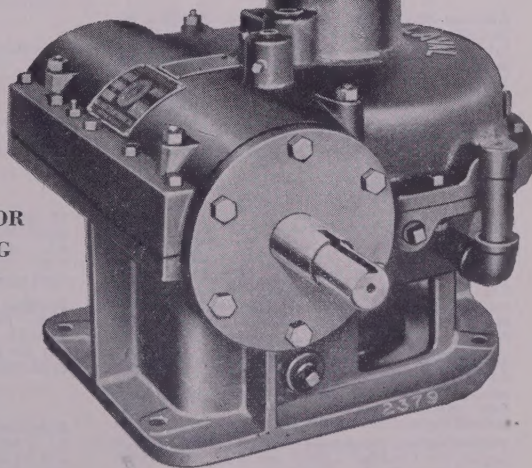


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MISSOURI

JOPLIN, MO.—A. Y. McDonald Mfg. Co., 1201 Dodge St., Omaha, Nebr., has awarded a \$109,000 contract to B. & G. Construction Co., 411 E. Sixth St., Carthage, Mo., for construction of a warehouse; Swanson-Terney-Brey, Reliance Bldg., Kansas City, Mo., architect.

NEBRASKA

HOLDREGE, NEBR.—Equity Exchange has awarded a \$125,000 contract to Chalmers & Borton Construction Co., Hutchinson, Kans., for construction of a grain elevator.

NORTH DAKOTA

GRAND FORKS, N. DAK.—Minnkota Power Co-operative plans to erect a power plant; Ellerbe & Co., First National Bank Bldg., St. Paul, engineer.

OHIO

LORAIN, O.—Lorain Metal Treating Co. has been experimenting with enameling and heat treating heat exchangers which are used to regulate the flow of heat into the wings of bombers, preventing icing conditions. Immediate expansion in the business will be necessary if experiments now being conducted by the Army are successful.

TOLEDO, O.—Owens-Illinois Glass Co., Libbey Glass Division, Ohio Bldg., has awarded a \$315,000 contract to George Lathrop & Son, 1510 Montcalm St., for construction of warehouse.

PENNSYLVANIA

EDDYSTONE, PA. — Baldwin Locomotive Works has been awarded the contract for two hydraulic turbines by the U. S. Army Engineers, Portland, Oreg., district. The turbines are for the Detroit dam and are rated at 70,000 hp each, under a head of 235 feet, operating at a speed of 163.6 rpm. Total value of the contract is approximately \$1¼ million.

PHILADELPHIA—George W. Neff, architect, 1520 Locust St., will let contract for \$150,000 for construction of a factory for Globe

Solvents Co. Inc., Seventh St. & Fishers Ave.

WEST MIFFLIN, PA.—Westinghouse Electric Corp., Atomic Power Division, will let contract for a \$1 million administration and laboratory building.

TEXAS

BEAUMONT, TEX.—Gulf States Utilities Co., 362 Liberty St., plans to erect a \$2.5 million generating unit.

DALLAS—Peter Paul Inc., 6124 Denton Dr., will build a \$240,000 candy manufacturing unit, own forces.

DALLAS—Rounds & Porter Co., Hines & Shorecrest Sts., will build a \$300,000 wholesale sash and door manufacturing plant; own forces.

FALFURRIAS, TEX.—La Gloria Corp., Driscoll Bldg., Corpus Christi, Tex., plans to build a \$500,000 gasoline recovery plant.

HOUSTON—Katy Park Industrial Development Corp., First National Bank Bldg., has awarded a \$2.5 million contract to O'Rourke Construction Co., 4011 Koehler St., for construction of a repair shop.

HOUSTON—Foremost Dairies Inc., A. E. Johnson, general manager, Houston branch, announces plans for a \$350,000 expansion program; a new milk plant will be constructed at the rear of ice cream plant, 1705 Washington St., and the ice cream plant will be remodeled; engineering and planning have been done by H. K. Ferguson Co., Cleveland.

HOUSTON—Following have subcontracts for steel plant facilities, Lockwood Dr. & Armour Dr., for National Steel Co., W. A. Fitch, local manager, for which Hubbard Construction Co., 1507 Delano St., has general contract: Plumbing, heating and air conditioning, E. C. Pritchett, 3200 Wheeler Ave.; reinforcing steel, Peden Iron & Steel Co., 700 N. San Jacinto St.; electric wiring, Hirsch Electric Co., 1017 Sampson St.; steel, McRan Co., Hempstead Rd.; structural steel and miscellaneous iron, Commercial Iron Works, 5422 Esperson St., all of Houston. C. J. Klein, engineer, David M. Duller,

Second National Bank Bldg., structural engineer.

McKINNEY, TEX.—Texas Textile Mills build a \$245,000 textile unit; own forces. SUGAR LAND, TEX.—Imperial Sugar Co. awarded a \$242,000 contract to Southwestern Construction Co., Box 1204, Houston for a remelt sugar plant, part of a \$4 million expansion program; Truman B. Wall 1705 W. Gray Ave., Houston, architect-engineer.

UTAH

SALT LAKE CITY, UTAH—Standard Oil of California, 164 S. W. Temple St., plans to build a \$10 million catalytic cracking for refinery.

WISCONSIN

GREEN BAY, WIS.—Wisconsin Public Service Corp., Bellen Bldg., has plans for a million warehouse, etc.; plans by J. Somerville, 403 Walnut St.

CANADA

VANCOUVER, B. C.—Bids for construction proposed wire, rod and cable mill for a minimum Co. of America were to be opened at Pittsburgh July 12. Grading of the has been completed and foundation piling being driven.

ALTONA, MAN.—Co-operative Vegetable Ltd. plans to build a \$100,000 plant.

BROOKFIELD, N. S.—Maritime Barytes plans to build a \$200,000 plant; General Engineering Co. Ltd., 100 W. Adelaide Toronto, Ont., engineer.

SAINT JOHN, N. B.—Beatty Bros. Ltd., N. Cabaldu, manager, St. John, N. B., plans to build a \$150,000 warehouse, Hayman Sq.

ST. JOHNS, N. F.—Standard Mfg. Co. Inc., 14 Water St., plans to build a \$175,000 factory.

MONTREAL, QUE. — International Paper Canada Ltd., 6700 Park Ave., has awarded a \$330,000 contract to Ross & Anglin Inc., 4400 St. Catherine St. W., for construction of a plant; D. J. MacDonald, 5255 C. Brook Ave., engineer.

PRICES OF LEADING FERROALLOY PRODUCTS

(Continued from Page 117)

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, \$1.40 per lb of contained Ti; less ton \$1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot \$1.28, less ton \$1.35. F.o.b. Niagara Falls, N. D., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract, \$160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%). Contract, \$175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

VANADIUM ALLOYS

Ferrovanadium: Open-Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, \$2.90 per lb of contained Va. Delivered. Spot, add 10c. Crucible-Special Grades (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), \$3. Primos and High Speed Grades (Va 35-55%, Si 1.50% max., C 0.20% max.), \$3.10.

Grainal: Vanadium Grainal No. 1, 93c; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots, \$1.20 per lb of contained V_2O_5 , freight allowed. Spot, add 5c.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, \$2.25 per lb of contained W; 2000 lb W to 10,000 lb W, \$2.35; less than 2000 lb W, \$2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, \$2.90 per lb of contained W; less than 1000 lb W, \$3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more. 1" x D, \$1.20 per lb of alloy. Less than 100 lb \$1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) \$1.20; Grade C (19% min. B) \$1.50.

Borasil: (3 to 4% B, 40 to 45% Si), \$6.25 per lb contained B, f.o.b. Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Contract, ton 2" x D, \$2.90 per lb of contained Cb, less \$2.95. Delivered. Spot, add 25c.

CM5Z Mixes: (No. 4—Cr 45-49%, Mn 4-18%, Si 21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.125%, C 3.50-5%). Carload, 12 M x D, load packed 19.0c per lb of material, ton 19.75c, less ton 21.0c. Delivered.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 3-5%, Ti 9-11%, Boron 0.55-0.75%). Carload packed, 1" x D, 43c per lb of alloy, lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, M 5-7%, Zr 5-11%, Fe 20% approx.). Contract, carload, packed 1½" x 12 M, 16.5c per lb of alloy, ton 17.50c, less ton 18.5c. Delivered. Spot, 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 11%). C.l. packed, 17.00c per lb of alloy; lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-18%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

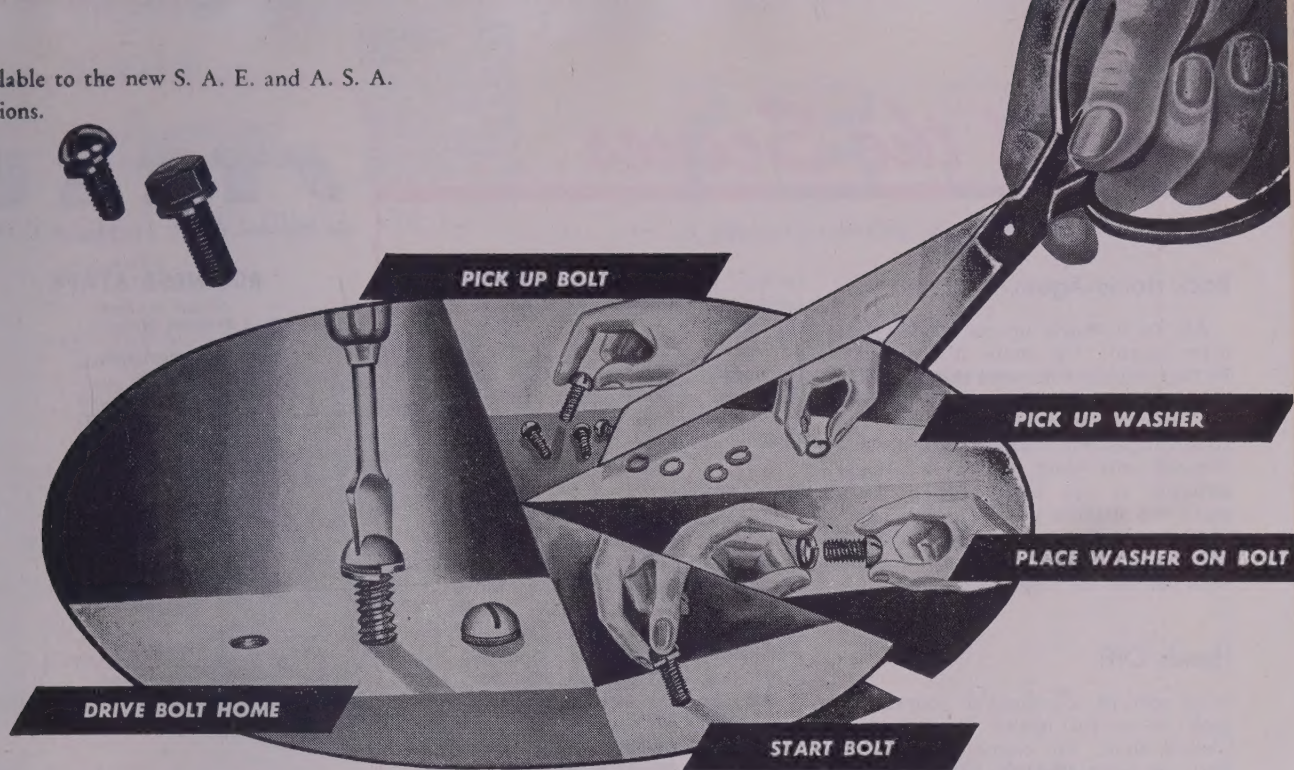
Simanal: (Approx. 20% each Si, Mn, Packed, lump, carload 11c, ton lots 11.5c, smaller lots 11.75c per lb alloy; freight exceeding St. Louis rate allowed.

Ferrophosphorus (23-25% based on 24% P tent with unitage of \$3 for each 1% of above or below the base); Gross tons per load, f.o.b. sellers' works, Mt. Pleasant, Sigo, Tenn.; \$65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, tained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity \$1.10.

Technical Molybde-Oxide: Per lb, contained Mo, f.o.b. Langeloth and Washington, packed in bags containing 20 lb of molybdenum, 95.00c.

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Behind the Scenes...

Back Home Again

Ah, to be back up on the Skyline drive again. Up there it was cool. In fact almost cold, and the humidity was low, and the air was fresh from the mountains. Here behind the steam pipes our orange crate desk is covered with dust, but we're busily cleaning it up, ready for a fresh start and another year of anticipation. Glad to be back if only we could have brought some cool weather along with us.

Heads Off!

As sort of a refresher course, we took a careful cruise through last week's book. Of course we had to find out what the boss said about us while we were unable to defend ourselves, and it wasn't too bad. Good thing he was vacation minded at the time. This week he's probably sitting forlornly watching all that fancy fishing tackle while the fish are eagerly snapping at the worms on his wife's line at the other end of the boat. At any rate, we hope he avoids the fate of the helmsman in last week's Washburn Wire ad. That poor character lost his head, literally.

Editorial Excellence

Have you noticed the revamped Business Trend section? With increased attention to business barometers one of the important characteristics of today's business, the editors have come up with a new arrangement which permits more figures to be presented and in an easier-to-read fashion. Those editors are always thinking of you readers, trying to do a better job for you. Seems that they're succeeding pretty well, too. We just checked over the whole list of winners in the 1949 *Industrial Marketing* contest for editorial excellence in business papers, and we discovered that STEEL won more awards than any other magazine. That seems to be a good indication!

Want Attention? Misspell

We, too, thought somebody in B. F. Goodrich's advertising department had slipped when we noted in recent ads the new "Rythm Ride" now being built into their tires. It was all intentional, however, part of a plan to gain more attention. We've been

tricked again. As a matter of fact, according to Goodrich publicity men, the spelling is correct, according to no less an authority than the Oxford Dictionary, which lists eight different ways to spell rhythm. There's no ryme or rheason for it, is there?

Days Open

If you are thinking of establishing a national Be Kind to Joe F. Plutz week, or a Send Orders to the Plutz Mfg. Co. week, or a Help Joe Buy a New Car Day, or something of the sort, now is the time to do it. According to the official calendar, this is the shortest official month in the year, with only two official days and no official weeks at all. This contrasts with May, which would have to have a total of 116 days in it to take care of all the days and weeks. Just shows that nothing ever happens in the summer time. Officially, that is.

Tin Plate, Up Now

This week starts off a new section in our Fundamentals of Steelmaking series. It's on tin plate, will run three instalments, and has been prepared by A. K. Kadell of Weirton Steel. We are still taking orders, incidentally, for reprints of all previous sections. Send them to Readers Service, singly, in dozens or hundreds and we'll see that you get them post haste. Prices are nominal—just what it costs us to have them reprinted.

Fifty Years Back

Fifty years ago this week they were having a heat wave, without benefit of air conditioning, mechanical refrigerators, or even electric fans in any great number. That didn't seem to affect business, however, as the week was "the most remarkable in the history of the American iron trade," according to our editors. There was already much buying for 1900, a thing unheard of in previous years. Demand for iron ore was also increasing, and the "present rate of consumption (15,000,000 tons annually) will soon end the life of the biggest properties in the Lake Superior region." Sound familiar?

Shradu

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STEEL

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